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WILDLIFE IN NORTH CAROLINA

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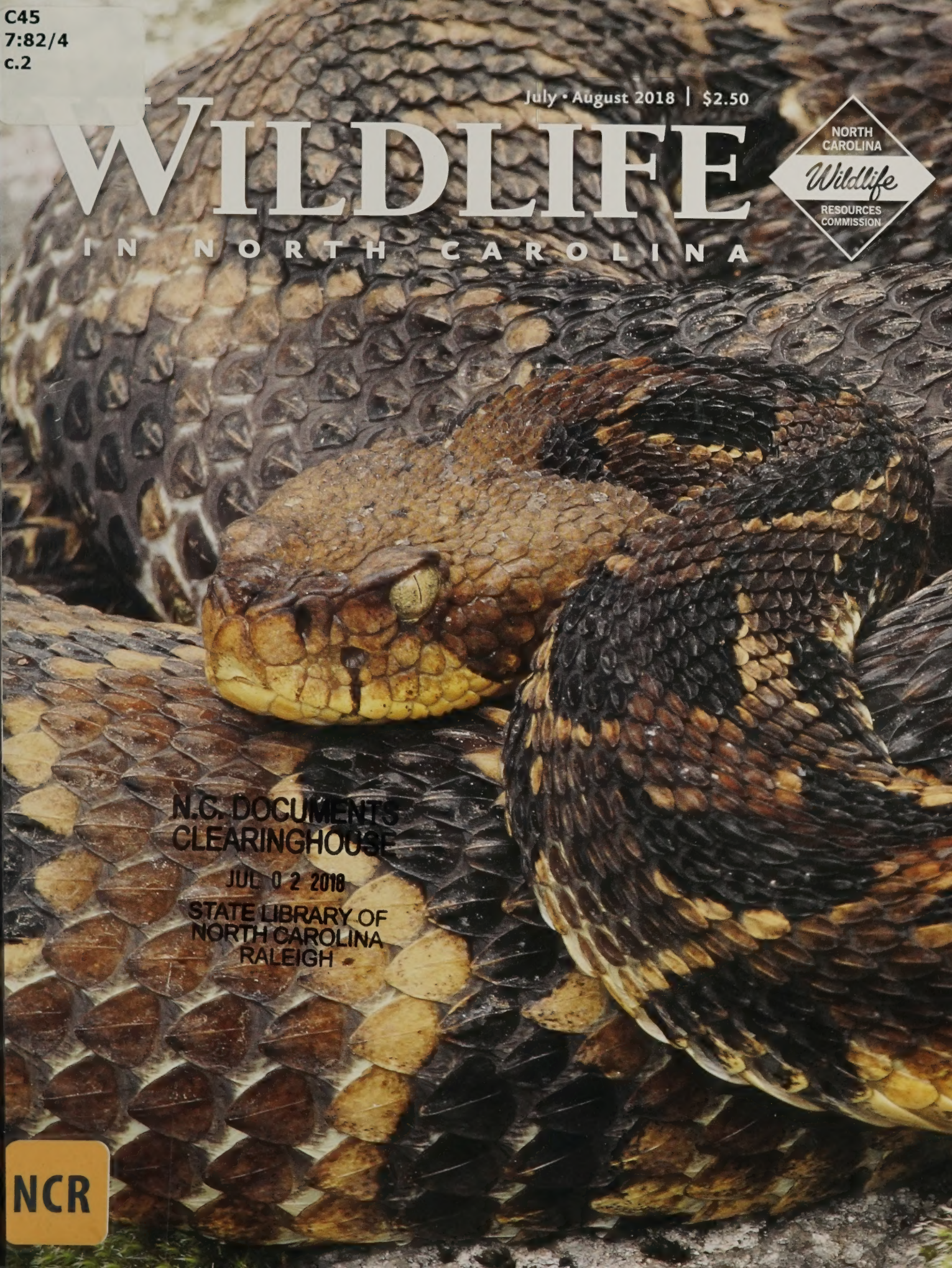

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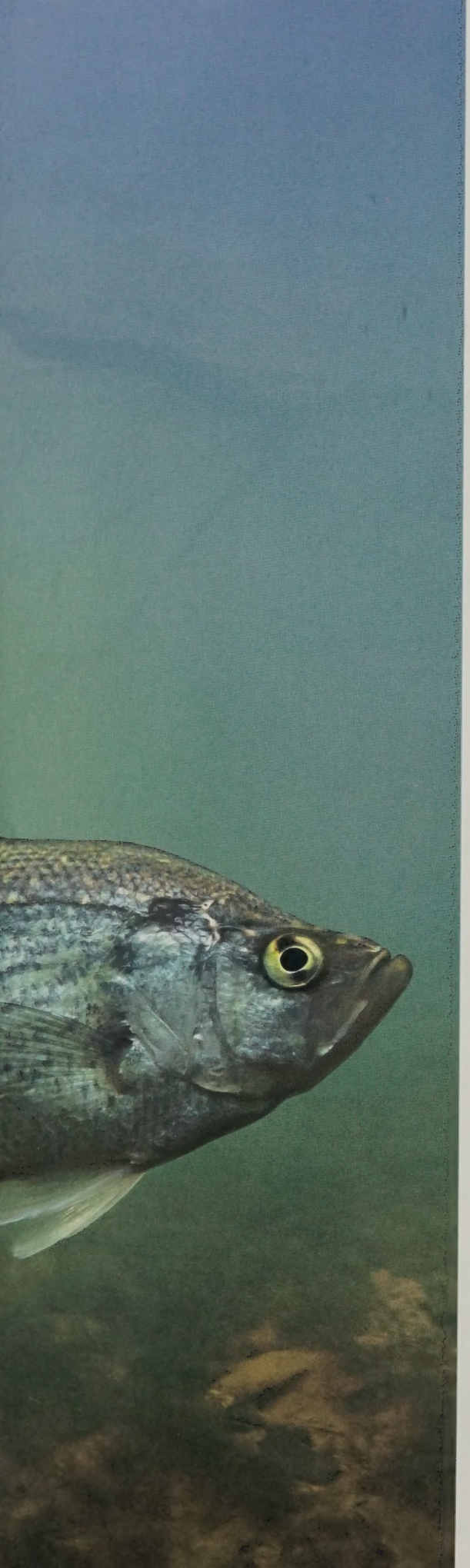
Crappie are prolific and make for great table fare—a good combination for anglers. Black crappie are populous in Piedmont reservoirs. **PHOTOGRAPH BY ENGBRETSON UNDERWATER PHOTOGRAPHY.**



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Cover: Be aware, not necessarily afraid, of timber rattlesnakes, like this gravid female basking in a patch of sunlight in Pisgah National Forest. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Jeff Beane has been penning articles about snakes, salamanders and all sorts of herps for *Wildlife in North Carolina* for 20 years. His passion comes through in each story, including a deep dive into timber rattlers on page 26 of this issue. Beane discusses coming across a timber rattlesnake on a Coastal Plain road during a recent Fourth of July and describes the snake "as a living symbol of why I love this land, and one far more deserving than I of residing here."

TODD PUSSER

His reaction is hardly hyperbole, but rather reflects Beane's genuine love of animals—particularly reptiles and amphibians. Beane serves as collections manager of herpetology at the N.C. Museum of Natural Sciences, where he has worked for 33 years. Besides going to meetings, Beane describes his job hardly as work but rather an extension of his personal interests.

"I do a lot of my field work in my free time. It overlaps a lot. My work is a lot of what I would be doing anyway," Beane said. "Most people, if you're lucky, you get to do something you enjoy and believe in. I really pity people who work their whole lives 8 to 5 and they live for the weekend . . . I actually look forward to coming in to work."

Beane also enjoys writing about herps, though he laments that the process takes longer than he would like (you're not alone, Jeff). He has been a regular contributor to the magazine since his first article about Carolina bays, entitled "God's Ponds," was published in our April 1998 issue.

"[Raising awareness] is the main reason I write," Beane said. "It's to try to use words to help others think about things, to evoke emotions and feelings in people . . . There is a lot of hatred for things like snakes and spiders and bats; things that there really is no reason to hate at all."

Beane's love for those animals developed as a kid growing up in Asheboro. He recalls a green snake crawling out from behind his toy box when he was a toddler, and being fascinated with them ever since. "I was fascinated that everyone was afraid of them or not interested in them. They would say, 'Don't go in the weeds because the snakes will get you.' As soon as their backs were turned, I would go in the weeds to see if I could get a glimpse of one . . . I ended up reading as much as I could [about herps] and learned that everything I was being told was wrong."

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WILDLIFE IN NORTH CAROLINA

JULY • AUGUST 2018 VOLUME 82, NUMBER 4

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The Accidental Birder

I received my latest issue of the magazine [March/April 2018] and have quite enjoyed it. I particularly enjoyed "The Accidental Birder" by Malorey Henderson. This was my favorite article in the issue—perhaps because I am so fond of birds as well as ecology/conservation efforts. Very well done! I wasn't aware of the yellow-rumped warbler (page 33). Birds truly are an indicator of an ecosystem's health and their decline is a sign of "ecological degradation."

I also like the fact that you publish an article in each issue written for children [Wild Notebook]. There is often an art or science project for them that reinforces the content. I enjoyed reading "Paradise in a Pocosin." It would be great for fourth graders. (They learn about pitcher plants and insects.)

Well, I just wanted to express my appreciation. Thanks for all of your hard work.

Robert M. Doyle
Rocky Mount

To Burn Or Not To Burn

It would seem to me that since North Carolina already has such a depressed quail population statewide and has had for years, that any controlled burns during any part of the nesting season makes no sense and is counterproductive. If you want to increase the quail population, why not do your burns some other time? As far as mimicking nature's lightning fires, I don't think I have ever seen a single natural lightning fire my whole life. Not to say they don't occur, but do they occur in a given area once every three years? It seems to me that every time we step in and try to make nature better we only mess it up worse.

Tom Clay
Charlotte

Mark Jones, supervisor of the Wildlife Research Program and editor of the Upland Gazette section that runs in the Fall and Spring guides, offered the following response to Tom's letter.

Thank you for your letter, which is packed full of important questions that can be addressed with research results. It seems logical that burning any quail nests would be a bad thing. However, research has shown that growing-season burns can be timed before peak quail nesting to impact a very small percentage of nests in most circumstances yet create better year-round habitat for quail.

In the study described in the recent Upland Gazette article, only 6.7 percent of quail nests were destroyed by growing-season fire, while the application of this fire created the ground cover quail need to thrive throughout the year. Growing-season fires favor quail-friendly plants and kill hardwoods that compete with grasses and forbs, and they do this better than winter burns. This allows overall quail populations to grow despite the loss of individual nests.

This use of growing-season fire is not unique to North Carolina. Quail populations on plantations in the Deep South (Florida and Georgia) are currently at record levels and are managed with tools that include a regime of carefully planned and timed growing-season burns.

What a Sucker

It was a genuine treat to see the [Northern] hogsucker honored with the cover shot on the May/June issue. It brought back heartfelt memories from over a half century ago when my buddies and I, and some other local regulars, would perch on the banks of Scotts Creek above the paper mill in Sylva and earnestly stalk this fish with our worms and poles. Catching one every few days or so was a thrill; sometimes they could get quite large. Back into the water they went for another day. Thank you for your tribute to this valued but little-recognized denizen of our mountain streams.

Jonathan Maxwell
Greensboro

Thanks For The Memories

Count me among the many who loved Jim Dean. Next to my dad, Jim is the one man I admire most. He was a man of endless talent. Amazingly, he was one of the most humble men that I have ever known.

Jim Wilson's tribute captured the essence of a beautiful, yet complex, man—no easy task. Thank you for a great article.

A while back I disposed of several stacks of periodicals that were gathering dust. Since Jim's passing, I have regretted that years of *WINC* were among the magazines thrown out. Josh Leventhal's recent Editor's Note gave me a reprieve. I am now "gulping away" online from the state library's Digital Collection [digital.ncdcr.gov/cdm/home/collections/wildlife]. Jim left a rich and ageless legacy of his wit and wisdom. Thanks for all the memories, Jim.

Dan Cooney
Cary

Jim sponsored me for membership in the Outdoor Writers Association of America 34 years ago, and that led to a lot of stories for a good number of newspapers and magazines over the years. We had pretty much gotten out of touch since we both retired and quit going to OWAA meetings, but I well remember his friendship and [former editor] Larry Earley's from years back.

And I remember all those columns, particularly the one about the Law of Discontinued Perfection, which I just finished re-reading. I thought about it recently when I finally, after several years of looking, found an A-minor harmonica. I should have followed Jim's advice and bought two, but I didn't. Hope I don't regret it.

Tom Dillon
Winston-Salem

write us

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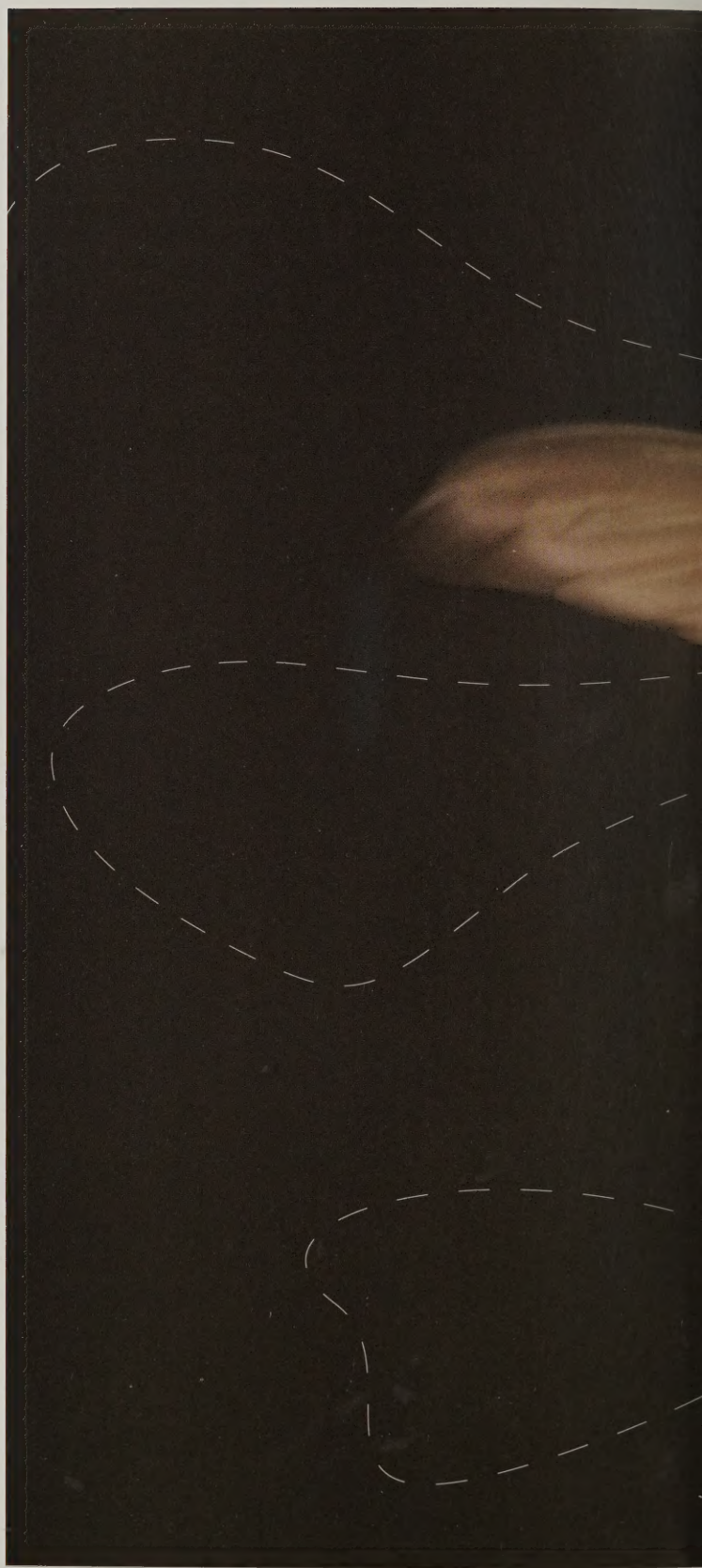
The Magic & Mystery

OF RUBY-THROATED HUMMINGBIRDS

They have been the focus of birders and non-birders for generations, but there is still a lot to learn about these dainty-yet-powerful creatures

WRITTEN AND PHOTOGRAPHED BY TODD PUSSER



Beating its wings 53 times per second, a male ruby-throat demonstrates the hovering ability for which hummingbirds are renowned.

Early Native American cultures believed them to be deities and omens of good luck. To the Mayans, they were the sun in disguise. Admired for their brilliant colors and ferocity in defending home territories, the ancient Aztecs of Mexico believed warriors who died in battle would be reborn as one. The Pilgrims, having never encountered anything like them in Europe, were so awestruck by their aerial prowess and tiny size, believed that they were a cross between a bird and an insect. To John James Audubon they were "a glittering fragment of the rainbow." For poet Emily Dickinson "a route of evanescence."

With their dainty size, jewel-like iridescent colors, and unbelievable powers of flight, it is no surprise that hummingbirds have captured our imagination for millennia. One need only to look at the common names of the more than 340 species to get a sense of the mystical wonderment humans hold for these extraordinary birds. Among the more evocative ones used to describe various hummingbird genera are fairies, caribs, woodstars, violet-ears, hermits, firecrowns, starthroats, pufflegs, coronets, goldenthroats, emeralds, sapphires, mangos, mountaingems, starfrontlets, streamertails, sunangels and woodnymphs.

Nestled among all this diversity are some truly superlative birds. The appropriately named bee hummingbird of Cuba is, in fact, similar in size to a bumblebee, and the smallest bird in the world. With a bill longer than its body and head combined, the sword-billed hummingbird of Peru claims the record for longest bill relative to body size of any bird in the world. The strongly curved bill of the white-tipped sicklebill makes it perfectly adapted for feeding on the nectar of tropical plants with curved flowers. Perhaps most spectacular of all is the male of the rare marvelous spatuletail, which flaunts two extremely long tail feathers with fan-shaped tips that can move independently of one another during courtship displays.

Female and juvenile ruby-throated hummingbirds (right) lack the distinct, iridescent red feathers seen on the throats of adult males (left). Opposite page: Nontoxic white paint marks the head of this captured adult male, making it easier for biologists to identify it in the field.

Early HISTORY

Though found throughout the Americas and Caribbean, the eastern half of the United States is home to just one breeding species, the ruby-throated hummingbird. This species, one of the few birds that most Carolinians can recognize at a glance without the help of a field guide, has inspired a sense of fascination among birders and nonbirders alike for generations.

In his 1709 book "A New Voyage to Carolina," early naturalist John Lawson writes "the hummingbird is the miracle of all our winged animals. He is feathered as a bird, and gets his living as the bees, by sucking honey from each flower." Not long after, and no doubt inspired by Lawson's admiring words, famed artist Mark Catesby provided the world with one of the first accurate scientific illustrations of the ruby-throated hummingbird sipping nectar from a trumpet creeper vine in his 1732 book "The Natural History of Carolina, Florida, and the Bahama Islands."

Upon observing Catesby's painting, but having never actually seen the species in the wild, the originator of scientific nomenclature, Carl Linneaus, gave the ruby-throat the name of *Trochilus colubris* in the 10th edition of his book "Systema Naturae," published in 1758. The scientific name stuck for nearly 100 years before Ludwig Reichenbach, director of the Dresdon Zoological Museum in Germany, redescribed the species as *Archilochus colubris*.

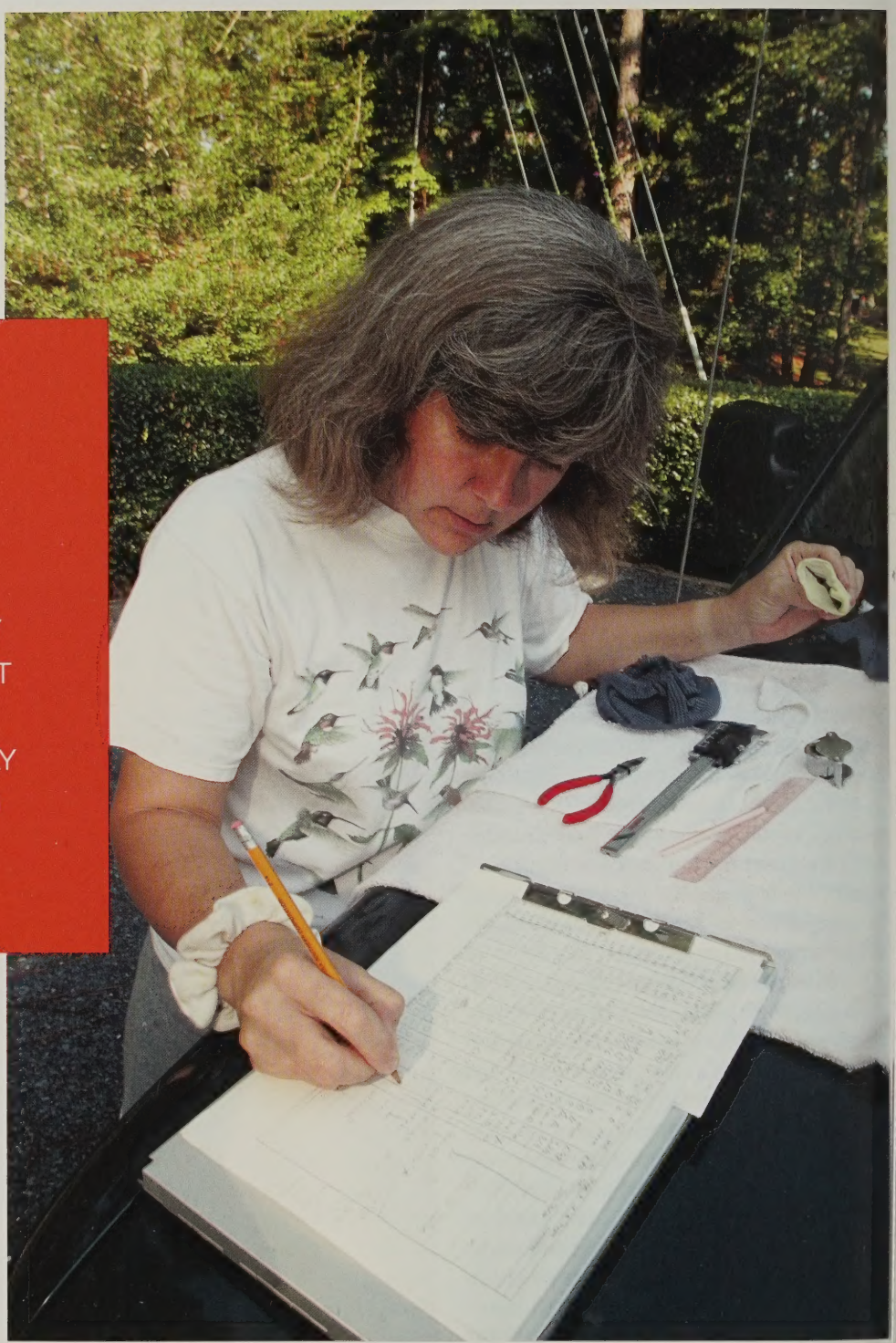
It was not until 1828 that painter and naturalist-extraordinaire John James Audubon coined the common name we all know today in his classic work "The Birds of America." Audubon based his name on the brilliant reflective red feathers found on the throats of adult male hummingbirds.

Like so many naturalists before me, I am enthralled with hummingbirds. I vividly recall as a kid watching the aerial acrobatics of ruby-throats around a nectar feeder my parents hung just outside the kitchen window. Later, I learned that hummingbirds move their wings rapidly in figure-eight patterns to hover in one spot. The birds' strong wing muscles make the backward strokes of their wing beat almost as powerful as forward ones. This allows the birds to flap their wings at an incredible 53 times per second, a speed so fast that it creates an audible whirring or humming sound.

Operating wing muscles at those speeds require calories, and to survive hummingbirds must eat the equivalent of 100 percent of their body weight in insects and nectar each day. With such large energy demands, ruby-throats spend much of their day searching for and defending nectar resources. Through their relentless pursuit of nectar

"HE IS FEATHERED AS A BIRD, AND GETS HIS LIVING AS THE BEES, BY SUCKING HONEY FROM EACH FLOWER."

THE BULK OF CAMPBELL'S WORK FOCUSES ON RAISING AWARENESS ABOUT THE TINY BIRDS THROUGH LECTURES AT LOCAL SCHOOLS, REGIONAL BIRDING GROUPS AND WEEKLY BANDING PROGRAMS DURING SUMMER MONTHS...

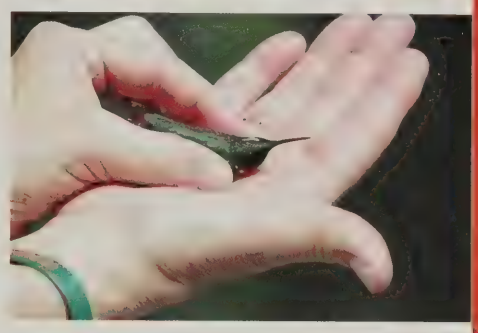


With over 20 years of experience banding hummingbirds, biologist Susan Campbell enters data from a recently captured bird.

across millennia, ruby-throated hummingbirds have shaped the life history of many of our state's native wildflowers. The shapes and colors of cardinal flowers, jewelweed, columbine and trumpet creeper, to name a few, are due in large part to the pollinating services of ruby-throats.

Local KNOWLEDGE

For the past 20 years, Susan Campbell has crisscrossed the state of North Carolina in pursuit of hummingbirds. As a research affiliate with the North Carolina Museum of Natural Sciences and one of the few licensed



The delicate process of banding a hummingbird involves weighing the bird, taking careful measurements of its wing and bill, fitting a small metal band around its leg and applying a non-permanent streak of white paint across its head. Banded hummingbirds in North Carolina frequently return to the same site year after year.

hummingbird banders in the state, Campbell has made some surprising discoveries about these Lilliputian marvels. Perhaps most noteworthy is the discovery that many western species, such as rufous hummingbirds, visit the state each winter, long after our native ruby-throats have migrated to warmer climates. The bulk of Campbell's work focuses on raising awareness about the tiny birds through lectures at local schools, regional birding groups and weekly banding programs during summer months at Weymouth Woods State Park in Moore County.

Recently, I joined Campbell at her home in the Sandhills as she attempted to band an early spring arrival ruby-throat visiting her backyard feeder. Hummingbirds, despite their small size, are not as fragile as one might assume. The male, defiantly bickering with a series of chips and chirps in Campbell's hand, barely weighs more than a penny.

"Oh, pipe down," Campbell says as she gently removes the bird from a wire cage placed on the deck of her house. It has taken less than a minute from my arrival at her house for the thirsty male to make a beeline to the feeder hanging inside the trap. Realizing my surprise at how fast she captured the hummer, Campbell says, "It's not always this easy."

As the male finally quiets down, Campbell lifts it up toward her mouth and gently blows the feathers apart on the bird's breast to gauge the amount of fat accumulated around its sternum, an indicator of overall health. "Just as I thought," Campbell says. "He's skinny." Not a surprise for a bird who has just arrived to his breeding territory after a journey of several thousand miles from his winter home in Central America.

After two decades of work, Campbell has become a seasoned pro at handling the small birds. She has banded more than 3,500 ruby-throated hummingbirds and it shows as she deftly maneuvers the hummingbird onto its side to place a tiny metal band around its leg. The numbered code on the band allows for identification in case the male is recaptured in the future. Banding studies like this have shown that ruby-throats, despite their small size and high metabolic rates, can live up to nine years.

I ask if any of the hummingbirds she has banded return to the same spot year after year. "Some hummingbirds are seen multiple times within the same season and others have been recaptured a year or more after banding" Campbell says. "One female went unseen for three years before she turned up again in the same spot in my trap." Surprisingly, not one of her banded ruby-throated hummingbirds has been found in any other state or on their tropical wintering grounds.

A tiny numbered metal band (above) fitted around the leg allows for easy identification of the adult male ruby-throated hummingbird (opposite). Ruby-throats are the only hummingbird species that nest in North Carolina (left).

Migratory UNKNOWNS

Scientists have long known that ruby-throated hummingbirds overwinter in portions of Mexico, Guatemala, Honduras and Costa Rica, but what migration route they take to get there is open to speculation. No one knows if the birds fly directly across the Gulf of Mexico or if they hug the coastline down to their wintering grounds. Many scientists were skeptical that the birds, with their small body size, could fly across the entire blue expanse of the Gulf of Mexico. However, a recent paper published in the scientific journal "The Auk" suggests otherwise.

Using flight simulation software along with data about fat content, weight and wing measurements from 2,700 birds captured on the Gulf Coast, scientists determined that these tiny birds can make non-stop flights of distances up to 1,300 miles. Birds could easily cross the entire expanse of the Gulf of Mexico in as little as 20 to 30 hours depending on wind conditions. The authors of the paper also suggest that males and older birds are capable of longer flights than females or younger birds. They believe the younger birds may hug the coast of the southern United States all the way around to eastern Mexico using the edge of the Gulf of Mexico as a guide, like Google Maps for hummingbirds.

Here in North Carolina, Campbell has noticed yet another quirk in ruby-throated hummingbird migratory patterns. During the past 20 years, more and more ruby-throats, adults and young alike, have been found overwintering along the state's coast, especially in the Outer Banks. Why this is happening is anyone's guess. Perhaps the warming effect of the Gulf Stream, at its closest point to the eastern United States off Cape Hatteras, moderates the coastal climate enough to allow the birds to feed on tiny invertebrates that are plentiful here even during the coldest months of the year. Maybe the birds are finding much-needed calories in sap wells created by woodpeckers in coastal hardwoods. Perhaps, our winters are just getting warmer, as most climate models show, and hummingbirds are taking advantage of that fact and short-stopping their long migration while saving precious calories. What is well known is that more and more people are keeping their hummingbird feeders up during the winter months, in large part due to Campbell's public outreach.

Prior to the mid-1990s, most scientists believed that ruby-throats were not hardy enough to make it through the winter. Campbell's banding studies have largely disproven that. "We now know that these birds can not only survive but thrive here during the colder months," she says. "Adults will return faithfully to the same site each fall, the way they do to the breeding grounds in the springtime."

Back in the Sandhills, Campbell is finishing working up the adult male. Sporting new swag across its leg and a dab of non-toxic white paint across the top of its head, she moves the bird into position for release. The paint, which will disappear once the bird molts its feathers later in the summer, makes it easier to observe in the field, allowing for Campbell or anyone else to tell at a glance that the bird has previously been captured.

Resting in the palm of her hand, the bird tilts its head slightly to the left and its throat feathers explode in color, like hot glowing embers in a campfire. Then with rapid wing beats, the hummingbird lifts off her hand and streaks off across the Carolina blue sky.

Todd Pusser is a marine biologist and frequent contributor to Wildlife in North Carolina. *Susan Campbell, a wildlife biologist and research affiliate with the North Carolina Museum of Natural Sciences, contributed to this article.*

A leery black crappie eyeballs the camera at close range. Crappie, both black and white, are among the most popular game fish in North Carolina.

HAVE A *Crappie Summer*

WRITTEN BY MIKE ZLOTNICKI
PHOTOGRAPHED BY MELISSA McGAW

The oddly-named but good-eating fish are plentiful and easy to catch, if you know what you're doing

ENGBRETSON UNDERWATER PHOTOGRAPHY

F. EUGENE HESTER

Crappie are one of anglers' favorite freshwater fish in North Carolina, and for good reason. What's not to love? In the spring, during pre-spawn and spawn, the fish are spread out in shallow water, making them easy to find and catch. That changes a bit in the summer, when the fish school up, head to deeper water and key on cover and structure.

They can still be caught in the hot summer months. Want to know how? Two Triangle-area guides who have put their clients on crappie for decades share their knowledge and offer tips on catching crappie.

Freddie Sinclair of Clayton is one of the best crappie anglers I've ever fished with. In fact, he's so good that I've actually paid for guided trips with him. (Yes, an outdoor writer actually paid for a fishing trip.) He's been crappie fishing for 30 years and guiding for 24.

Sinclair's specialty is long-line trolling with lines behind the boat, a nod to his former king mackerel fishing days slow-trolling menhaden. His home lake is the 14,000-acre Jordan Reservoir, but he fishes all of the Piedmont reservoirs. I talked to him during a trip to Jordan with my wife, Renee, fellow N.C. Wildlife Resources Commission employee Thomas Harvey and his wife, Danielle. Guided trips are an excellent way to introduce new anglers to fishing, and there's no guilt taking a mess of fish home for the fryer.

"Well, black crappie don't tend to go out real deep," said Sinclair, a retired N.C. State University employee. "So, I tend to fish 10, 12, 16 feet deep in the summer months. That's the deepest I'll get. A lot of times they're suspended. A lot of times they're on brush piles, rock piles and road beds—some sort of cover. The white crappie are more main-lake fish. They'll be a little bit deeper and tend to be in the logs and the stumps."

Sinclair fishes out of a new Ranger 621 walleye boat with a 350-horsepower Mercury outboard on the back and a 112-pound thrust Minn Kota Ulterra trolling motor on the bow. It is a spacious, comfortable platform that gets a party of anglers to a destination quickly. Sinclair trolls multiple lines using Southern Crappie Rods. The 9-, 10- and 12-footers fan from the stern out, with 14- and 16-footers farthest out perpendicular to the gunwale. The spinning reels are spooled with 6-pound test monofilament. During the spring spawn, Sinclair will use $^{1}/_{64}$-ounce and $^{1}/_{32}$-ounce jigs tipped with a minnow in the shallows. He changes it up some in the summer.

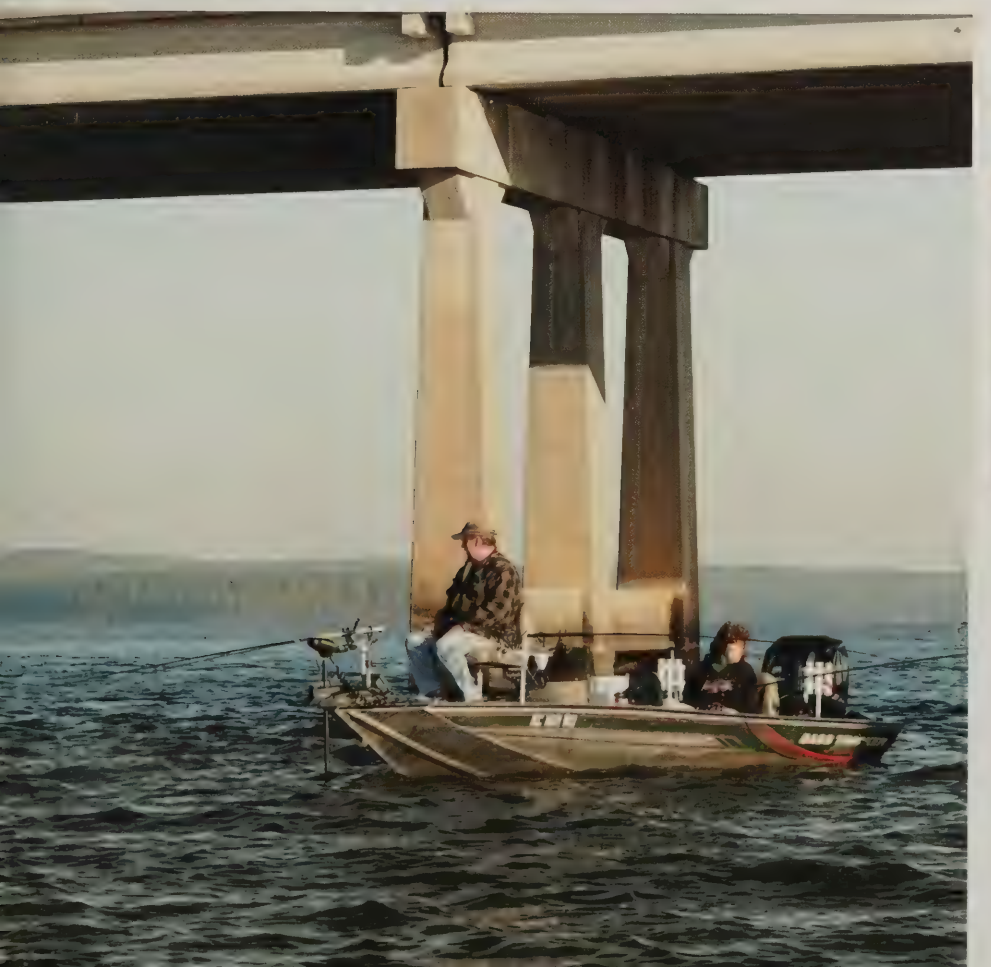
"I always tip hair [marabou] jigs with minnows. A lot of times in the summer we'll go strictly with curly-tail jigs and no bait," he said. "They bite just as well. You can catch a lot of fish on just a curly tail jig. In the summer months I tend to use $^{1}/_{32}$- to $^{1}/_{16}$-ounce jigs. We're casting the jigs out anywhere from 40 to 60 feet behind the boat. That varies for a particular boat, but for my setup I tend to cast them a little bit farther out. You have some guys just flip 'em out there 20, 25 feet and it works well for them. My typical trolling speed will range from .5 to 1.1 miles per hour."

Sinclair considers his long-line trolling a form of the popular "spider rigging" technique, in which multiple lines are set out from different parts of the boat, giving the craft the look of a giant spiderweb.

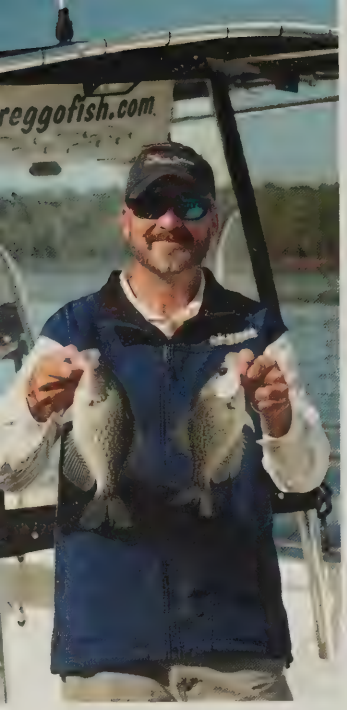
"It's all basically spider rigging," Sinclair said. "There's vertically tight-lining, which can be done off the front or rear of the boat or both, and there's longline trolling, where we cast the lines out 40 to 60 feet in most cases. It's all spider rigging, just two different versions. A lot of guys vertically spider rigging will have anything from a $^{1}/_{8}$-ounce jig fishing shallow water to a half-ounce egg sinker when fishing deeper to keep your lines vertically straight down. When spider rigging from the front of the boat you need more weight to keep the lines vertical."

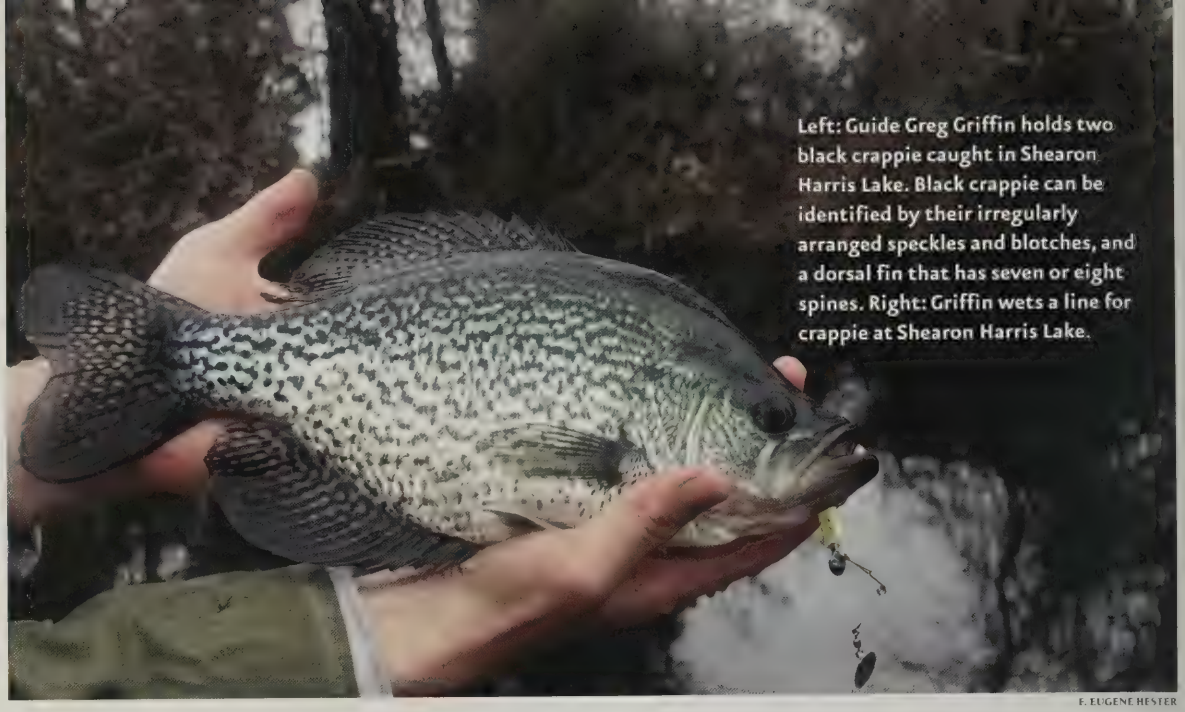
'EVERYBODY WANTS THEM'

Another Triangle-area guide who knows the crappie game is Greg Griffin of Holly Springs. He guides for a variety of species and puts clients on black crappie at Shearon Harris Lake, which is best known for its largemouth bass fishery. Harris is about 4,100 acres in size.



Opposite: Small spinnerbaits can be an effective way to catch crappie in shallow water. Top: Wildlife Resources Commission biologists employ a trap net fence to guide crappie into a net for collection. Above: A biologist measures a crappie as part of data collection. Left: Anglers employ the spider rigging technique of multiple rods deployed while searching for post-spawn crappie.





Left: Guide Greg Griffin holds two black crappie caught in Shearon Harris Lake. Black crappie can be identified by their irregularly arranged speckles and blotches, and a dorsal fin that has seven or eight spines. Right: Griffin wets a line for crappie at Shearon Harris Lake.

F. EUGENE HESTER

"Crappies were an incidental species for me. I fish for anything. I've always offered two trips on Shearon Harris: bass fishing and variety fishing, and crappie is part of that variety," Griffin said. "Crappie is popular; everybody wants them. So, I don't specialize in them, but as many people who want to do it, I figured it out. Those and white perch, people love to eat them. I enjoy them on artificials, but we don't do that much on trips. I call Freddie Sinclair every winter because I get a lot of crappie trips in the winter. I've fished Jordan for over 20 years and I know it well, but that's all he does and I don't go out there much. I like Freddie a lot. I understand those fish on Harris."

Griffin said one of the main differences between crappie at Harris and Jordan is that the Harris crappie tend to relate to structure like lake points.

"That's my sweet spot," Griffin said. "From May through September, summer months, I'm looking at main lake points, and I employ two tactics in the summer. One is the slip cork, that's my main way to catch them. The fish are relating to the bottom because there there's no cover. So, I'll mark a big school with the electronics and I'll throw a marker buoy on them and I'll set the cork a foot off the bottom. And I use shad in the summer. That'll be a little tricky for the average Joe. They can be hard to catch and hard to keep alive. Minnows will work, but they won't work like a shad. The two methods are that and a little drop-shot rig."

"Crappie are voracious. If I see them on the depth finder, they're caught."

A slip cork slides along the fishing line until it is stopped by a knot or other tiny obstruction to set the bait at a predetermined depth. It makes for easier casting.

Griffin uses 6-foot light action spinning rods made by Temple Fork Outfitters paired with a 1500 or 2000 series spinning reel spooled with Fins 40G braided line. He uses a short fluorocarbon leader and a No. 2 fine-wire hook. He hooks the shad through the nostrils or the lips. He fishes out of a 25-foot Carolina Skiff with a 175-horsepower Suzuki outboard on the back.

"Crappie are voracious," he said. "If I see them on the depth finder, they're caught. Jordan and Falls are almost identical in the way they fish. More cover related. More brush piles. More stuff. In the winter they like bridges and channels."

HEALTHY HABITAT

Kirk Rundle, District 3 fisheries biologist for the Commission, said that Shearon Harris has a healthy population of crappie.

"We sample crappie at Harris every other fall on even years with trap nets," he said. "I think the crappie fishery at Harris is excellent with a good percentage of larger fish available for anglers. The fish also appear to have good growth rates with plenty of forage."

Jordan Lake experienced a fish die-off in 2011 that included crappie and their primary forage, threadfin shad.

"In the winter of 2011, a cold spell caused a large shad die-off in Jordan Lake," said Kelsey Lincoln, District 5 fisheries biologist. "The Commission surveyed black crappie in the fall of 2009, 2010 and 2013, which provided biologists with a before and after picture of the population. While the Commission did not survey the population in the fall of 2012, it is believed that some of the larger crappie in the population may have experienced a die-off from the reduction of available forage fish."

Lincoln said that currently, the black crappie population has rebounded and is thriving.

"We sample Jordan every three to five years and our last black crappie survey was in 2015," she said "We caught 959 fish in two nights and 74 percent of surveyed fish were greater than 8 inches and 35 percent were greater than 10 inches. Growth appeared to be normal and the fish were in excellent condition."

Lincoln's fishing report is great news for Tar Heel anglers.

"As of 2017, it was back as good as it'd ever been," Griffin said. Sinclair concurred. "Oh, [Jordan Lake is] doing really good. It's really bounced back. We've got good fish in it, a lot of bait fish. It's doing really well."

Christian Waters, chief of inland fisheries for the Commission, agreed. "Today Jordan is recovered and multiple year classes of crappie are being caught."

Finding fish is the key to catching them, and electronics can play a big role in that. "The main thing on these Piedmont lakes in the summer is electronics," Griffin said. "I honestly don't know how people caught them before. I'd like to talk to guys from 50 years ago and ask them 'How did you find these fish?' You have to find them on electronics. In the summer they're schooled up and you have to find them."

And what do you do after you find them? Catch and eat them. Crappie have a sweet, mild flavor and are wonderful fried. There are many variations on the frying theme, and Sinclair shared one that's new to me. Typically, Sinclair uses House-Autry Seafood Breader seasoned with a little lemon pepper spice on the fish, and then into the grease they go.

"There's a new recipe that I found out about that I like," he said. "You take yellow mustard, put your fillets in a bowl, coat the fillets with French's or whatever, and then put your House-Autry Seafood Breader in a pan, crunch up some Fritos corn chips and mix with the House Autry. Put you fillets in the mix, coat 'em good and then put the fillets in your hot grease. I've had more compliments on this recipe. Something about the mustard and Fritos corn chips. The mustard doesn't overwhelm it. It's a good recipe."

Mike Zlotnicki is the associate editor of Wildlife in North Carolina. *He can be reached at 919-707-0175.*

Get to Know Your Fish: Crappie Classification

CLASS: Osteichthyes (bony fishes)

ORDER: Perciformes

FAMILY: Centrarchidae

AVERAGE SIZE: White crappie range from 6.7 to 20.9 inches in total length; black crappie range from 5.1 to 19.3 inches. Typical catches of either range from 8 to 10 inches. Crappies can weigh up to 3 or 4 pounds, but they typically reach a weight of one-quarter to one-half pound.

FOOD: Young crappies feed primarily on zooplankton and insects. Adults feed primarily on fish, but also feed on insects.

SPAWNING: Begins in March and continues through May. Crappies build nests in shallow, calm water near vegetation. The nests are often built in groups.

Black crappie females produce between 11,000 and 188,000 eggs; white crappie females produce between 2,900 and 91,700 eggs. Eggs for both species hatch within 3 to 5 days. The females produce the eggs and the male crappie does everything else: selects the nest, fertilizes the eggs, guards the nest and the young.

YOUNG: Crappie fry feed on the yolk sac for three to five days, and then they leave the nest. Maturity is reached at an age of 2 to 3 years.

LIFE EXPECTANCY: A maximum age of about 9 years.

ILLUSTRATIONS BY DIANE RAVER

ZONING IN ON THE PIER ZONES

How to target fish on North Carolina's coastal piers, from the wash to the tips

Written by Richard "Dr. Bogus" Ehrenkaufer

Ocean fishing piers have been a part of the North Carolina seascape for over 90 years, since the construction of the state's first ocean pier at Kure Beach in 1923. In the 1970s through the late 1980s, as many as 35 functioning fishing piers graced over 300 miles of North Carolina's ocean coastline, from Kitty Hawk to Sunset Beach. Following the opening or our newest pier, the "new" Jennette's concrete pier in the spring of 2011 in Nags Head, we sadly have roughly just 20 fishable piers along our coast. Mother Nature and the proverbial wrecking ball have seen to that.

Remember the evil twins Bertha and Fran (1996) and their just as evil male siblings Dennis and Floyd (1999)? Since my relocation to the Bogue Banks in 1992, the number of piers in the area has gone from seven to two: Oceanana Pier and Bogue Inlet Pier.

Did you know that there are over 3 miles of ocean pier fishing space in North Carolina? Although the numbers have diminished, the popularity of fishing piers remains strong. Piers are egalitarian. They welcome the common Joe or the high-end angler, the elderly and young, the gregarious and the recluses, the skilled and the novice. Even those without a fishing license are accommodated by the blanket licenses currently held by all fishing piers.

BRYAN GOODWIN/LIQUID VIDEO PRODUCTION

Why the popularity? Fishing piers offer fishing options; "vertical" options from the shoreline of the beach often out to 1,000 feet. They let you target fish that you want to catch, from panfish in the beach surf zone to king mackerel and other large game fish at the far end of the pier.

FIND YOUR PLACE ON THE PIER

Let's take a walk on the pier and find some fish. Although there are no lines of demarcation, no Mason-Dixon Line, I like to conceptually divide the pier into zones for targeting specific fish species. What are those zones? Who lives there? How do you catch them? Let's start from the beach and work our way out.

First, we need to define the pier zones. This is how I classify them: beach/swash, suds, slough (the deep), sandbar (where appropriate), post sandbar (the deeper) and king land (the deepest). There are also some specialty zones of note, like the pier support pilings, the cleaning table (a.k.a. the feeding table), reef balls or other intentional fish attracting debris, and the dreaded broken pier bits and pieces of days past.

Top to bottom: Coastal fishing piers serve a wide variety of anglers inexpensively and effectively. The end of the pier is for king mackerel anglers, who typically use one rod to anchor a weight to the bottom, then employ another with bait to slide down the anchor rod line. Sunrise finds many anglers on a fishing pier awaiting the bite.

MARC CONNOLLY

MELISSA McGAW/NCWRC

JOSH PHILLIPS

ZONE 0: The swash. This is where the wave action washes up and back. There aren't many catchable fishes here, but there is fish food: coquina clams, worms and the Sisyphean mole crabs (better known as sand fleas).

ZONE 1: The suds. Edibles from the swash will wash into the suds, the breaking waves of the surf zone, where many hungry bottom-feeding fish await an easy meal. These fish include sea mullet, pompano, red and black drum, and even flounder.

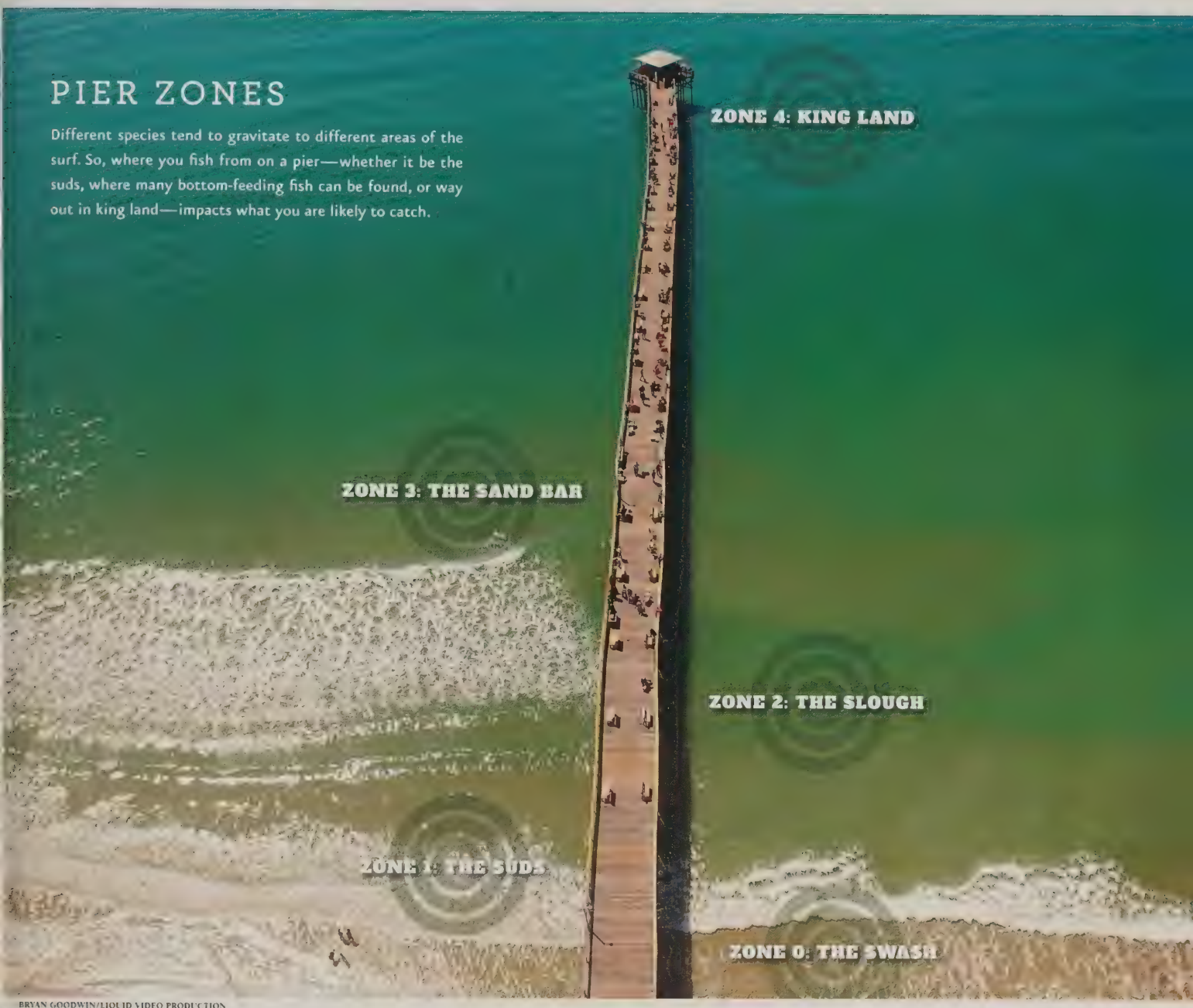
ZONE 2: The slough. Many of our beaches have a sandbar that may be 100 feet, or even 100 yards, from the beach proper. Between the beach and the outer sandbar is an area of deeper water called the slough. The slough is feeding grounds for many fish, but most frequently it includes suds fish like sea mullet, drums and flounder. Particularly in the fall, this area can feature speckled trout, croakers and Northern puffers.

In the spring and late fall, the slough often features pigfish, skates and rays. In the fall, when we often get a traditional "mullet blow"—which is the mass emergence of finger and striped mullet from back waters on the heels of a chilly northeast wind—almost all predators will join the slough feeding fest, including Spanish mackerel and bluefish, south-going speckled trout with puppy drum and flounder. It's a wondrous sight to see millions of mullet with hungry predators at their tails.

ZONE 3: The sand bar. Around the edges, and sometimes on top of the sandbar, we can occasionally see pompano and red drum. Once we pass the bar and get into Zone 3, we can target many of the panfish, including spots, sea mullet, croakers, sand perch and pigfish. In the spring and fall, we also fish for Northern puffers, which travel in large schools, put up little resistance and are some of the best-tasting fish in the sea. We also start to find better numbers of Spanish mackerel and bluefish in this zone.

Before I go any further, there is a seasonal bent to which side of the pier to fish on due to the migration pattern of various fish species. Many fish go north in the spring and south in the fall. So, in the spring, experienced pier anglers fish the south side of the pier; in the fall, they fish the north side. On piers that are on south-facing beaches, like on Bogue Banks, remember west is south and east is north. Also, fish like spot and sea mullet often come in to feed on a rising tide and move out on a receding tide; this can be even more pronounced at night. Many fish have excellent night vision and are heavy feeders at night or in low light conditions. Bluefish, Spanish and speckled trout are among the good low-light feeders.

ZONE 4: King land. This is where the sidewalk ends roughly 1,000 feet from where we started. Here we find a plethora of predators working the deeper water, often 15 to 20 feet deep. This is where most of the bluefish and Spanish mackerel are caught,


PIER ZONES
Different species tend to gravitate to different areas of the surf. So, where you fish from on a pier—whether it be the suds, where many bottom-feeding fish can be found, or way out in king land—impacts what you are likely to catch.
ZONE 4: KING LAND
ZONE 3: THE SAND BAR
ZONE 2: THE SLOUGH
ZONE 1: THE SUDS
ZONE 0: THE SWASH

BRYAN GOODWIN/LIQUID VIDEO PRODUCTION

along with false albacore and sometimes gray and speckled trout. In recent years, blackfin tuna have made an appearance in Zone 4. Often, the false albacore, blues and Spanish are found in large schools blitzing the diminutive glass minnow baits around the pier, making Zone 4 a hardhat area with sharp-tooth fish being slung over the railings, and projectile lures and sharp treble hooks flying in the air.

I call Zone 4 king land because you need a king mackerel pass to fish here and because this is where big fish are targeted. Anglers with anchor rods, heavy-duty fighting tackle and light-tackle, bait-catching gear are set up to target the big fish: king mackerel, tarpon, cobia, crevalle jacks, barracuda, red drum, mahi mahi and "Hatteras" blues on "king rigs" with live bait. Other fish caught in king land include triple tails, spadefish and ladyfish.

This end of the pier is also a great location to observe natural wonders of the sea. Bogue Inlet Pier in Emerald Isle has an observation deck rising above the pier near the end. Sea turtles, dolphins, ocean sunfish, cownose rays, manta rays and even whales are sometime visitors out at the end of piers.

Specialty Zones: These areas include pier pilings, submerged broken-off pilings and maybe even reef balls added as fish attractors. From spring to fall, pier pilings

DAVE ALLEN

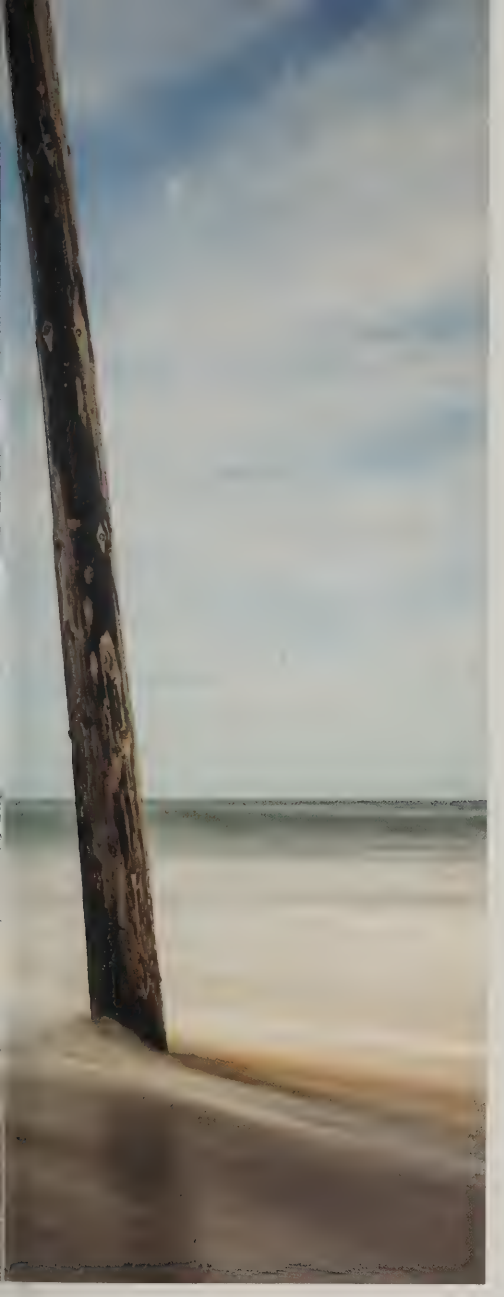
often serve as feeding grounds of sheepshead, ranging from close to the shore but more typically in deeper water. These munchers and crunchers eat barnacles, small crabs and other stuff that cling to and live on the pilings. Don't forget the fish cleaning table, whose scraps tossed into the ocean act like a chum bucket that attracts anything from shark to flounder.

"If you don't have a net, look around the pier to see who has one in case of an emergency. Most people are very willing to help a fellow angler retrieve their special catch and respond quickly to "HELP, I NEED A NET!"

GEARING UP

So now that you know what to catch and where, it's time to venture into the subject of how to catch fish on a pier—specifically the gear and baits you need to be successful. First, make sure that you have a pier cart and cooler to haul your gear, hold your bait and hopefully keep your catch of the day cold and fresh. On the pier you see many nice, store-bought aluminum carts and many homemade models of various degrees of sophistication. A cooler with wheels will do in a pinch.

Most pier anglers do not have a pier drop-net to haul their prized fish from way down there to way up here, often 20 feet or so. It probably is not necessary to have one if you are targeting spot or sea mullet, but it is a necessity if you target flounder. I learned that the hard way. Many flounder are lost on their way up to the pier without a net because they are notorious violent head-shakers. They also have bony mouths, so effectively setting a hook can be a challenge compared to most fish. If you don't have a net, look around the pier to see who has one in case of an emergency. Most people



are very willing to help a fellow angler retrieve their special catch and respond quickly to "HELP, I NEED A NET!"

Now for the rods, reels and rigs. You see people fishing from the pier with almost everything. I recommend a 6- or 7-foot rod with a backbone stiff enough to haul up your fish and a 2500 to 4000-class reel packed with 10- to 20-pound fishing line. This covers most fishing options, except for king mackerel fishing, but that's another story for another time.

Now for baits. Although natural baits can be messy, they are the most popular option. Standard bait rigs are two-hook hi-lo rigs with No. 2 or No. 4 long shank hooks, perfect for most panfish. Colorful fireball rigs for bluefish and Carolina or slider rigs with No. 2 to No. 2/0 wide gap Kahle style hooks are the most effective for live baiting flounder, red drum, trout and other predatory fish.

Now, repeat after me: "I will only use FRESH or live bait." By this I mean shrimp, bloodworms or fish strips that have never been frozen or allowed to ferment or bake in the sun on the pier for hours. Otherwise, you end up using the equivalent of seafood jerky, when what the fish really want is sushi.

What bait you use depends on what you're trying to catch. For panfish—such as spot, pompano, croaker or sea mullet—fresh shrimp is often the ticket (although spot sometimes won't bite anything but bits of bloodworms). A great, sometimes overlooked alternative is the sand flea or mole crab that can be gathered for free from the beach swash zone around the pier and are considered a delicacy for sheepshead, pompano, sea mullet and red and black drum. More recent substitutes for natural baits are the excellent family of Fishbites baits that imitate bloodworms, clams, shrimp and more, and are brightly colored to boot.

We already mentioned crabs and worms for live bait, but let's focus particularly on live minnows and live shrimp. These baits particularly target flounder, drum, trout, Spanish mackerel and bluefish. Live minnows include finger mullet, mud minnows, peanut pogies (juvenile menhaden) and other small shad that need to be kept alive in a live-bait bucket, either one with a battery-operated aerator that is kept up on the pier or one that is hung over the side of the pier in the water below. These baits can be rigged on a Carolina rig or floated on a cork for trout, flounder and drum, or if targeting citation-size Spanish, they are merely free-floated at the far end of the pier.

ARTIFICIAL ALTERNATIVES

Artificial baits are also popular on the pier, but remember, because we're up here and the water is way down there, not all artificial lures function properly on the pier. Most lures that are used require special care in handling and use the awkward upside down and backward rod and reel retrieval orientation only seen on piers. Here are some favorites:

- GOT-CHA plugs, which are specifically designed for effective pier use and will literally catch (or at least hook) almost anything that bites, from Spanish, blues and trout to cobia, tarpon and kings and even a pompano or two. White and chartreuse bodies with Day-Glo red heads are most effective. There are also "field" modified versions with spots, stripes and reflecting tape.
- Many swimming plugs are usable, especially ones that swim with a downward motion, such as Rat-L-Traps, and anything with a lip, like the Yo-Zuris. MirrOlures can also be used but need a slow retrieval to keep them water-borne and not airborne.
- Heavy metals, like Stingsilvers, Kastmasters or Hopkins, are often used when false albacore are around tearing up schools of glass minnows.
- Soft plastic baits can be rigged on a lead jig head, usually a quarter- to half-ounce and are jigged slowly along the bottom for drum, flounder and speckled trout—especially in the fall. My recent favorites include various plastic shrimp, such as Vudu or Betts Halo Shrimp, or Halo Shad and the Z-Man Trout Trick baits.
- Of course, I can't overlook Berkley Gulp! baits, which revolutionized flavored baits. I like the white or chartreuse swimming mullets and the shrimp. The shad baits are also popular and effective.

Finally, I would like to mention the very effective use of bare-naked gold hook rigs. These rigs consist of a series of half dozen or so No. 2 or No. 4 laser sharp gold hooks strung along several feet of heavy duty 40-pound test line. They are cast and slowly retrieved or incessantly jigged vertically in an up-and-down motion attracting blues, Spanish and other predators. The ends of the rigs are usually terminated with a diamond jig. These terminal diamond jigs have been known to find flounder, trout, kings and even an occasional tarpon.

So now you know about the who and where of fishing pier zones and some of my favorite tricks. I hope this makes your next visit to one of our state's many surviving ocean fishing piers enjoyable and productive enough to bring home freshly caught dinner. Just remember to target the fish YOU want to catch and you will be more successful in the long run.

Richard "Dr. Bogus" Ehrenkaufer is a retired chemist and college professor based out of Emerald Isle who provides fishing reports and columns for various publications and has a radio show about fishing. His reports can be found on his website, ncoif.com.

FISH TACOS with Curtido Slaw

RECIPE BY CHAD MCINTYRE
PHOTOGRAPHED BY MELISSA MCGAW

Topped with a tasty Curtido slaw, Chef Chad's rendition of this popular dish is quick, easy and full of flavor. Chef Chad uses red snapper for this recipe, but fillets of most saltwater white-fleshed fish will do, including mahi mahi, grouper, flounder, halibut or cod. Give it a try on a summer night; you won't be disappointed.

You can put your own personal touches on this recipe with a variety of tweaks based on taste. Chef Chad recommends lightly toasted corn tortillas for maximum flavor potential, but flour tortillas are an option if having a sturdier taco is more important to you. If a spicier slaw is what you desire, then consider mixing in a chopped jalapeno or some chilis. Other potential add-ons include fruits, like mango or orange, and your favorite hot sauce.

INGREDIENTS FOR THE CURTIDO SLAW (MAKES ABOUT 4 CUPS):

1/2 head white cabbage, shredded
1 large carrot, grated
1/2 medium white onion, thinly sliced
1/2 cup apple cider vinegar
1/4 cup water
1/2 teaspoon salt
1/2 teaspoon brown sugar
1 teaspoon dried oregano (preferably Mexican)
1/2 to 1 teaspoon red pepper flakes

Combine the cabbage, carrot and onion in a large bowl. Combine the remaining ingredients in a separate bowl, add to the mixture and stir. Refrigerate before serving.

PREPARING THE FISH

Clean fish as needed. Rinse and pat dry with a paper towel. Season with salt and pepper. In a heavy bottom pan, heat 1/4-cup of vegetable oil to a medium-high temperature. Carefully place the seasoned fish in the oil. Fully cook fish, flipping it at least once to ensure that it is prepared evenly. Once cooked, simply build the taco with a base of the Curtido slaw topped with the fish. Add a squeeze of fresh lime and chopped cilantro to taste.

BELEAGUERED ICON

Few species have been as maligned, or misunderstood, as the timber rattlesnake

WRITTEN BY JEFF BEANE | PHOTOGRAPHED BY TODD PUSSER

One recent Fourth of July, as the sun dipped along a lightly traveled Coastal Plain sand road, I spotted the beautifully-chevroned form of a live juvenile timber rattlesnake, better known as a "canebrake" around those parts. It made my Independence Day weekend, not only because I don't see these animals often, but also because it was a living symbol of why I love this land, and one far more deserving than I of residing here.

After a few quick photos of the snake on the road, I slid a snake hook beneath him, lifted him carefully across on his chosen trajectory, snapped a few more shots and watched him glide slowly away. At no point did he attempt to bite, or even rattle. But if history is any indicator, that small serpent was lucky I came along, instead of almost anyone else.

The sight of a timber rattlesnake slithering off a gravel road in Pocosin Lakes National Wildlife Refuge would be a treat for any naturalist.

A Snake for America

When Europeans first invaded America, not least among the novel creatures they met was a snake with a buzzer on its tail. Because this animal had, over eons, developed a proteinaceous cocktail facilitating procurement and digestion of its small vertebrate prey; and because this, introduced into human tissue, produced agony, morbidity, even potential death, it became a special target for fear and hate. Even the timber rattlesnake's (very unscientific) scientific name reflects this: *Crotalus* from the Greek *krotalon*—a bell or rattle; *horridus*...well... Carl Linnaeus, the Swedish botanist who described the species in 1758, harbored limited reptile appreciation.

Few creatures have been persecuted to the timber rattlesnake's extent. Once common over most of the eastern U.S., from central New Hampshire and Lake Champlain south to northern Florida and west to central Texas and southeastern Minnesota, including portions of 31 states, it has been extirpated, often deliberately, from large portions of that range—including southern Ontario, its former Canadian foothold. Historically statewide in North Carolina, it now persists mostly in wilder parts of the Coastal Plain and Mountains, the Uwharries representing its last stronghold in the heavily settled Piedmont. Many North Carolinians have never seen one, and some accept this gladly.

But there's another kind of person. Those familiar with the timber rattlesnake invariably appreciate it. Some name it their favorite animal. Those are the people I like to hang with. Included might be Theodore Roosevelt ("If it can it will get out of the way, and only coils up in its attitude of defence [sic] when it believes that it is actually menaced.") and Benjamin Franklin ("She never begins an attack, nor, when once engaged, ever surrenders: She is therefore an emblem of magnanimity and true courage...she never wounds till she has generously given notice, even to her enemy, and cautioned him against the danger of stepping on her. Was I wrong, Sir, in thinking this a strong picture of the temper and conduct of America?"). Teddy and Ben were astute observers of the shy, peace-loving rattlesnake, recognizing the difference between self-defense and aggression.

The Gadsden Flag

The same year of Franklin's essay (1775), the rattlesnake graced one of America's first flags—the bright yellow "Don't Tread on Me" Gadsden Flag. Soon after, Continental Congress adopted it as the new nation's first symbol, approving the design for the official Seal of the War Office. Some 240 years later, it's still included in the Department of the Army's official seal.

Timber vs. Canebrake

Timber rattlesnakes vary geographically. Two subspecies were once recognized, but genetics don't support their separation. The montane form, ranging over most of the northern and western portion of the range, including the North Carolina Mountains and Foothills, is the "timber rattlesnake" (formerly *Crotalus horridus horridus*). This form typically has 23 scale rows at midbody and occurs in a "yellow phase" (dark chevrons on yellowish or brownish background) and a "black phase" (often nearly plain black with only faint pattern, occurring only at higher elevations).

The lowland form, ranging along the Atlantic and Gulf slopes, including most of the North Carolina Piedmont and Coastal Plain, is commonly called "canebrake rattlesnake" (formerly *C. horridus atricaudatus*), after the stands ("brakes") of cane (*Arundinaria* spp.) it sometimes inhabits. Canebrakes typically have 25 scale rows at midbody, a prominent reddish-brown middorsal stripe, and a broad dark stripe behind the eye. They tend to be slightly larger, heavier-bodied and more colorful, with no black phase. While most rattlesnake venom is hemotoxic (destroying red blood cells and damaging tissue), some canebrakes also produce neurotoxic (nerve-damaging) venom.

Behaviors, reflecting habitat and climate, also separate them. Montane timbers typically hibernate communally in deep rock fissures, and pregnant females congregate in sunny, rocky gestation sites. In colder climates, such "dens" and "birthing

Opposite: Well-camouflaged and dusted with pollen, a Coastal Plain "canebrake" rattlesnake rests on the forest floor. Clockwise: A timber rattlesnake takes a defensive coil in Pisgah National Forest. The "chevron" pattern is one of the identifying characteristics of a timber rattlesnake. The bluish cast to this rattlesnake's eye and skin indicates that it is in premolt—a vulnerable time for snakes.

In mountain habitats, pregnant female timber rattlesnakes (above) often gather at communal gestation sites. The young (right) usually remain near their mothers for several days after birth. Opposite: A yearling dark phase timber rattlesnake from Transylvania County. The dark color phase occurs only at high elevations and probably enhances thermoregulation.

rookeries" are essential microhabitats, thus limiting distribution.

Coastal Plain snakes typically overwinter singly in stump holes or similar refugia, and females usually gestate alone. Less reliant on specific microhabitats than montane snakes, they are correspondingly less vulnerable to predation and human exploitation.

Most Piedmont snakes resemble canebrakes physically, but some populations may exhibit behaviors more like mountain timbers, sharing hibernacula or gestation sites, although in smaller numbers.

A Timber's Life

Like all snakes, timber rattlers live in a chemosensory world. Their forked tongues are their primary sensory organs, delivering messages from their surroundings to the Jacobson's organ, thence to the brain for sorting. Heat-sensitive facial pits help detect warm-blooded prey—hence the term pit viper. Rattlesnakes have relatively poor eyesight, but readily detect movement. Deaf to airborne sounds, they are super-sensitive to vibrations. Their venom, produced by modified parotid salivary glands, is injected via hollow, curved, folding fangs in the front of the upper jaw. Metabolically expensive to make, venom evolved for food-getting and is only secondarily and reluctantly used for defense.

Timber rattlesnakes eat mostly small mammals—shrews, mice, voles, rats, squirrels and rabbits—and occasionally birds. They are remarkably efficient predators, due in part to their venom, which not only kills, but also begins the digestion process. Rattlesnakes crawl slowly, but strike very rapidly. Typically, they are "sit-and-wait" predators. Rodents often use logs as runways; a snake, locating such a spot, may wait, camouflaged, in "ambush posture," head pointing upward alongside the log (hikers are hence frequently advised to carefully step on, rather than over, logs). Woe be unto Chester the Chipmunk, bopping heedlessly along. If envenomated, he'll typically run just a few meters before keeling over, and the snake leisurely follows the

Why Do Snakes Have Forked Tongues?
See Nature's Ways, page 43.

scent trail until it can locate and swallow its meal. This low energy expenditure means efficient living; rattlesnakes may survive for months on one decent meal—although they'll eat much more often, given the opportunity.

Rattlesnakes—especially juveniles—in turn have numerous predators. Even adults are taken by larger, bolder carnivores like alligators, bobcats, coyotes, red-tailed hawks and great horned owls. Deer reportedly kill them occasionally. Some predators, including opossums and Eastern kingsnakes, are apparently immune to their venom.

Like most pit vipers, timber rattlers bear live young, usually in late August or early September in North Carolina. Mating is often in late summer, when snakes are in peak condition, but may also occur in spring or fall. Females can store sperm for months or years. Litter sizes range between four and 20; Coastal Plain animals tend toward larger litters. Young are 8 to 16 inches long at birth, and usually remain near their mother for their first few days, dispersing after their first molt. Adults average 3 to 5 feet in length; the record is 74.5 inches. Males grow slightly larger than females, and have longer, thicker tails.

Coastal Plain canebrakes may reach sexual maturity in as little as three to five years; montane animals may require eight or nine. Reproduction is metabolically expensive, and females usually give birth only every two to four years. Captive timber rattlesnakes have lived past 30 years, but very few reach that in the wild. Most females produce no more than three or four litters in their lifetimes. This low fecundity has likened timber rattlers to "turtles without shells"—populations are easily depleted and slow to recover, and mature females are extremely important components.

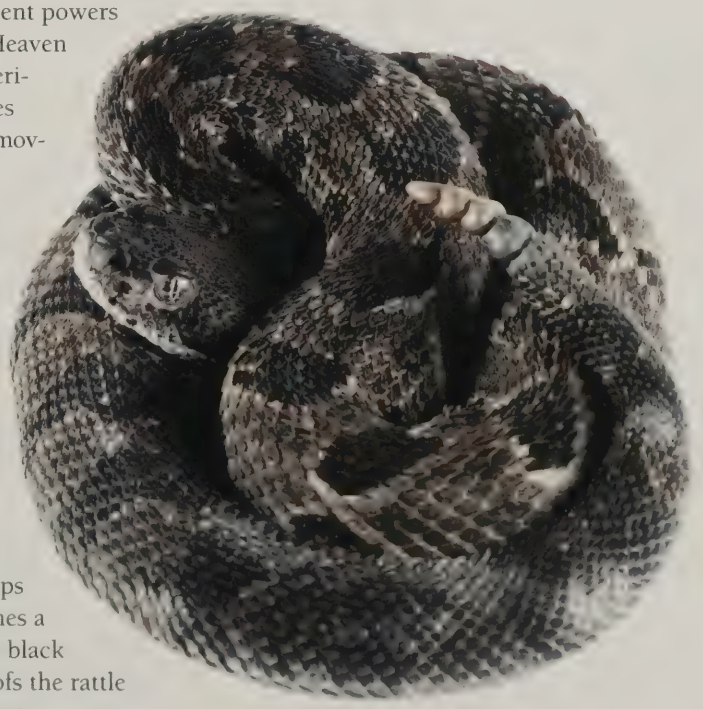
Timber rattlesnakes exhibit strong site fidelity within relatively large home ranges. They know where they are and what they're doing. My friend John Sealy, who has spent decades studying timbers, is fond of saying that they are always "on important snake business." Well-meaning persons who relocate snakes long distances to "safer" locations are usually endangering them; studies show translocated individuals experience high mortality. Short-distance translocations (less than 200 meters) are recommended, and highly successful, for "nuisance" snakes.

Movers and Shakers

Science doesn't support the existence of spirit animals, but I have a feeling they exist nonetheless. In my life, rattlesnakes have been a great blessing. I have occasionally felt or sensed them before seeing them. None of the many I've encountered over the years has failed to impart a transfusion of exhilaration, hope and courage—spiritual sustenance for dark times. Not very many people would concur, but, for whatever reason, I never fit the "very many people" category. And while I've never felt threatened by a rattlesnake, or had the slightest desire to harm one, I've always exercised great caution around them.

Rattlesnake myths abound, many of them involving the rattle.

Owning property where rattlesnakes occasionally appear has been a dream come true. On such rare occasions (that juvenile by the front porch steps, the female gestating by the barn for two non-consecutive summers), I'm inclined to offer silent thankful prayers to such benevolent powers potentially existing in Heaven or on Earth for the experience. I find few creatures more beautiful, or more moving, than rattlesnakes.



Rattlesnake myths abound, many of them involving the rattle. Some are quite outlandish, including the notion that snakes use their rattles to sing to their mates, or to hypnotize their prey; or that the rattle contains a poisonous, blinding dust; or that if the rattle gets wet it drops off and the snake becomes a "water rattler" (unless a black widow spider waterproofs the rattle with its web); and the most common—

Eastern Coral Snake

MEET THE OTHER VENOMOUS FIVE

Humans harbor a deep-rooted fascination with animals capable of dealing serious injury or death, namely those few large predators that occasionally attempt to eat us, and those possessing potent venoms. The actual danger in such creatures is frequently exaggerated, particularly for venomous snakes. Snakes bite only to obtain food or to defend themselves, engaging humans only when their personal space is closely invaded, if then. Caution, respect and common sense will prevent most snakebites. Besides the timber rattlesnake, North Carolina has five species with venoms potentially dangerous to humans.

Eastern Coral Snake

(Micrurus fulvius)

SIZE: Adults are 18–36 inches.

Our only member of the family Elapidae (including Old World cobras, kraits and mambas).

RANGE: Extremely rare; restricted to sandy habitats in southeastern corner of state.

HOW TO IDENTIFY: Black snout, wide yellow band across head, and wide red and black bands separated by narrow yellow ones ("red-on-yellow") easily distinguish it from nonvenomous scarlet snake and scarlet kingsnake (both have red snouts and red and yellow bands separated—"red-on-black").

VENOM: Potent neurotoxic venom, but statistically our least dangerous venomous snake (no records of bites in North Carolina). Only rough handling with bare hands would likely induce a bite.

DIET: Eats mostly snakes; occasionally lizards.

NOTABLE: Lays eggs. State-listed Endangered.

Copperhead

(Agkistrodon contortrix)

SIZE: Adults are 24–48 inches.

RANGE: Virtually statewide (except Outer Banks, extreme elevations in Mountains and some highly-urbanized areas). By far our most common and widespread venomous snake, accounting for perhaps 90 percent of bites.

HOW TO IDENTIFY: Copperheads are easily identified by brown hourglass-shaped crossbands on a lighter background. Juveniles resemble adults, but have bright yellowish tail tips.

VENOM: Hemotoxic. Bites are painful, often causing localized tissue damage, but virtually never fatal.

DIET: Eats small mammals, birds, lizards, snakes, amphibians and large insects—especially caterpillars and cicadas.

NOTABLE: Bears live young.

Cottonmouth

(Agkistrodon piscivorus)

SIZE: Adults are 27–71 inches.

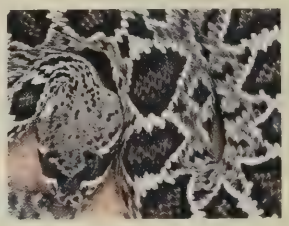
RANGE: Coastal Plain and extreme eastern Piedmont. Reports from Mountains and western Piedmont are based on misidentified Northern watersnakes or other species. Heavy-bodied and semiaquatic, cottonmouths rarely travel far from water.

HOW TO IDENTIFY: Young have bright yellowish tails and patterns similar to, but less well-defined than, those of copperheads. Older snakes are darker, with more obscured patterns. When frightened, rapidly vibrates tail and gapes, revealing whitish mouth interior. Some individuals may stand their ground when startled, but despite persistent stories, cottonmouths are nonaggressive and do not chase people.

VENOM: Hemotoxic. Bites are painful and potentially dangerous, but deaths are extremely rare.

DIET: Eats fish, amphibians, reptiles, birds and small mammals.

NOTABLE: Bears live young. [See "Cottonmouth!", August 1995.]



Eastern Diamondback Rattlesnake

(Crotalus adamanteus)

SIZE: Adults are 36–72 inches. Our largest venomous snake.

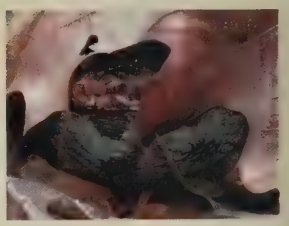
RANGE: Extremely rare; restricted to large pine flatwoods in southeastern Coastal Plain.

HOW TO IDENTIFY: Indicative of their name, Eastern diamondbacks have dark diamonds outlined in black along the length of their gray or yellowish backs, with the diamonds near the tail resembling dark bands. Two light lines run along the sides of their heads.

VENOM: Potentially dangerous due to large size and potent hemotoxic venom, but few, if any, legitimate records of bites in North Carolina.

DIET: Eats mostly rabbits and rodents; occasionally birds.

NOTABLE: Bears live young. State-listed Endangered. [See "Big Trouble," July 1999.]



Pigmy Rattlesnake

(Sistrurus miliarius)

SIZE: Adults are 15–26 inches. Our smallest venomous snake, and, along with the copperhead, the least potentially dangerous.

RANGE: Outer Coastal Plain from Tyrrell and Hyde counties south and west into Sandhills; a few scattered pockets in southern Piedmont. Generally uncommon.

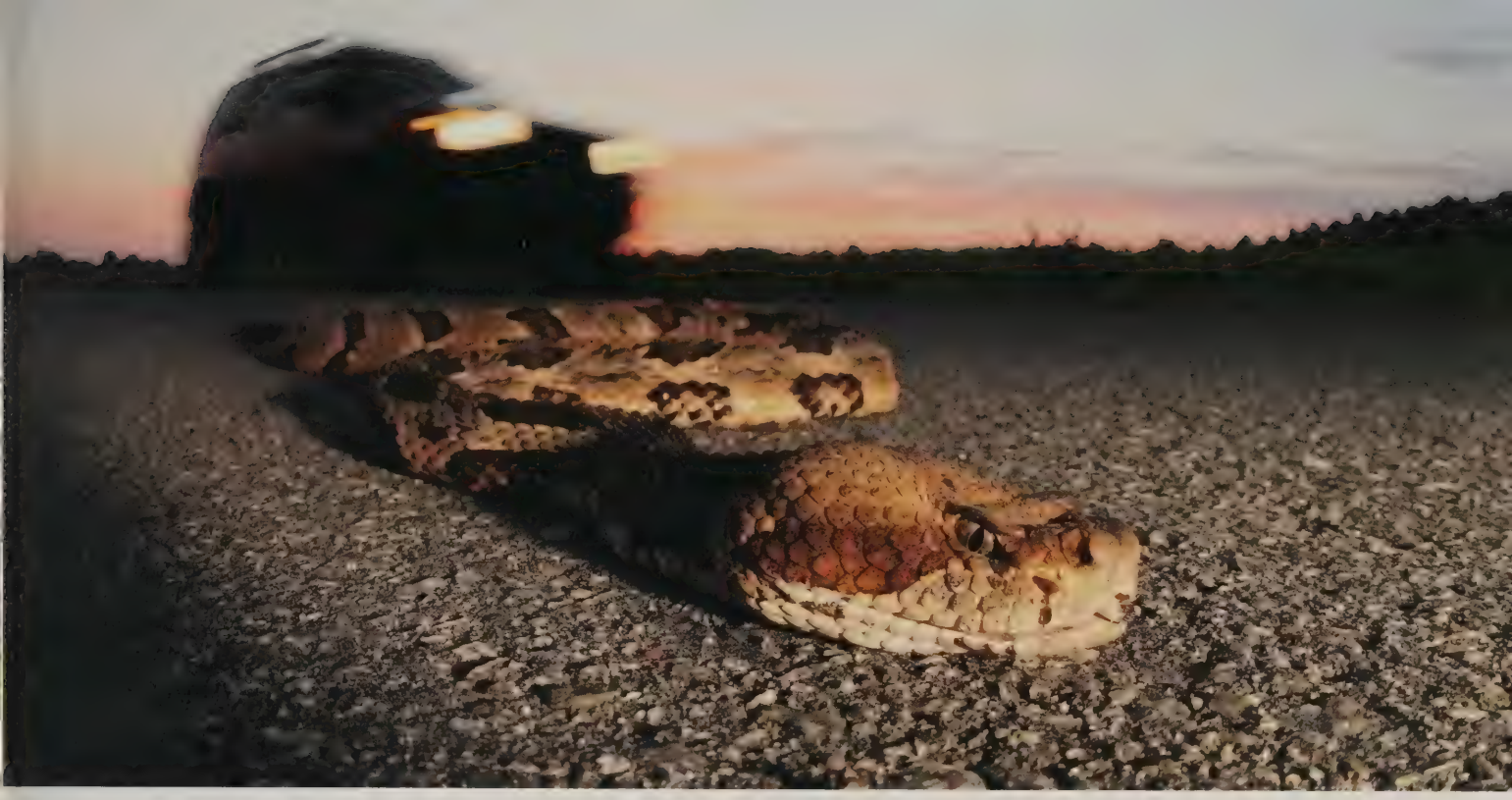
HOW TO IDENTIFY: Reddish or pinkish on Albemarle Peninsula and some other Coastal areas. Tiny rattle is often barely audible. Short-tempered when provoked.

VENOM: Hemotoxic venom.

DIET: Eats frogs, lizards, small snakes, small mammals and some arthropods.

NOTABLE: Bears live young. State-listed Special Concern. [See "Little Big Snake," June 2008.]

Pigmy Rattlesnake



Timber rattlesnakes face numerous threats, including habitat loss and fragmentation. Roads are often impassable barriers for these slow-moving animals.

that counting a snake's rattle segments indicates its age.

A rattle is composed of hollow, interlocking segments of keratin—the same material in our fingernails. A snake is born with a terminal "prebutton," replaced by the "button" upon shedding its natal skin a few days later. A new basal segment is added with each molt. Young snakes may shed three to five times their first year; old adults perhaps once or twice a year. A person familiar with a population can estimate age by examining an intact rattle, but segments break off easily and often, and older snakes are difficult to age precisely.

Rattles may have originated as "caudal lures"—some juvenile pit vipers, including copperheads, cottonmouths and the Mexican cantil, are known to twitch their colorful tail tips like wriggling caterpillars, potentially attracting frog or lizard prey. Pigmy rattlesnakes ("Little Big Snake," *Wildlife in North Carolina*, June 2008) also do this; their tiny, barely-audible rattles may enhance the ruse. Whatever their origin, rattles today function primarily as "do not trample" warnings.

If you try shaking a rattle rapidly enough to produce the same buzz a snake does, you'll find you can't. A snake's tail has "shaker muscles," physiologically specialized for sustaining high-frequency contractions, and vibrating as rapidly as 90 times per second—faster than a hummingbird's wingbeats. It's one of the fastest movements sustained by any vertebrate. I find such facts more interesting than mythology.

Timber Futures

Timber rattlesnakes face threats innumerable. Habitat loss and fragmentation is the greatest—enamored of big woods, they're one of the first reptiles to vanish when forests are cleared. They are slaughtered on roads. A recently detected fungus, *Ophidiomyces ophiodiicola* (aka Snake Fungal Disease or SFD), attacks scales—especially facial scales—causing severe dermatitis and often death; timber rattlesnakes are among the species most susceptible. Introduced predators like hogs and fire ants also factor in. Human exploitation, whether wanton killing or collecting for the pet, skin or Asian medicinal trades, continues to extract a heavy toll. In 1998, the timber rattlesnake was state-listed as a Species of Special Concern in North Carolina, prohibiting possession, take or harassment.

Besides their important ecological roles and their immeasurable aesthetic and spiritual value to the likes of me, rattlesnakes strike even closer to home. Compounds derived from venoms are proving effective against cancer, heart disease, stroke, brain injuries, high blood pressure and neurological diseases like Alzheimer's and Parkinson's. Venom research is still in its infancy, with who-knows-what medicines awaiting discovery.

Timber rattlesnakes may also be important agents in controlling Lyme disease, a bacterial pathogen spread by black-legged ticks, which feed on infected small mammals. Lyme can cause serious neurological problems, and occasionally death. One study, investigating rattler diets at four Eastern forest sites, revealed that each snake, via rodent consumption, was destroying 2,500 to 4,500 ticks annually. Ironically, rattlesnakes may be significant safeguards of human health.

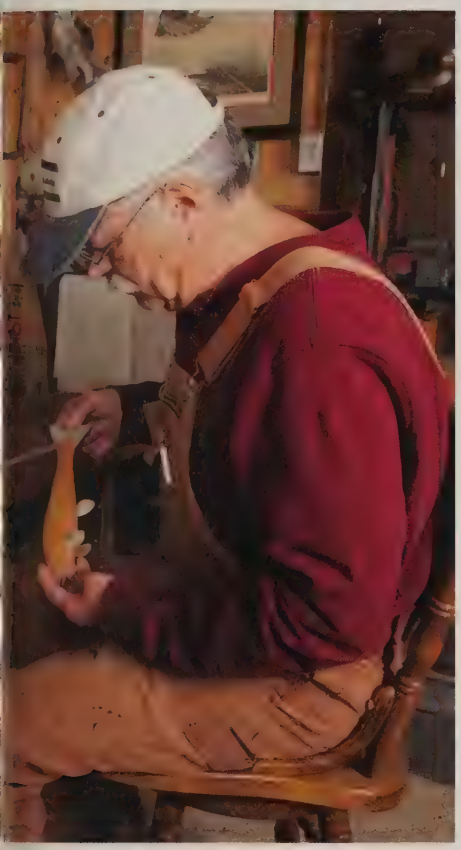
Finally, the timber rattlesnake is an "umbrella species." To protect it is to protect other things dependent on big, intact habitats—indeed, wilderness itself. Both resilient and fragile, the timber is wildness incarnate. Only time will determine whether it outlasts humanity's relentless hammering. I sometimes wonder what will. No species lasts forever. But the one calling itself *sapiens* could do worse than become better acquainted with the one once chosen to symbolize freedom—the one that, in the words of the poet Bret Harte, "Asked but—when all was said and done—To lie, untrodden, in the sun!"

Jeff Beane is a herpetologist and the collections manager of herpetology at the North Carolina Museum of Natural Sciences.

Badin's Piscatorial Picasso Carves and Paints Artofishal Fish

Henry Snuggs combines his passion for woodworking and fish into a unique artform

Written by Mike Marsh // Photographed by Melissa McGaw



Henry Snuggs works in his home studio to create wood carvings of fish species, like bluegill (left) and pumpkinseed (right).

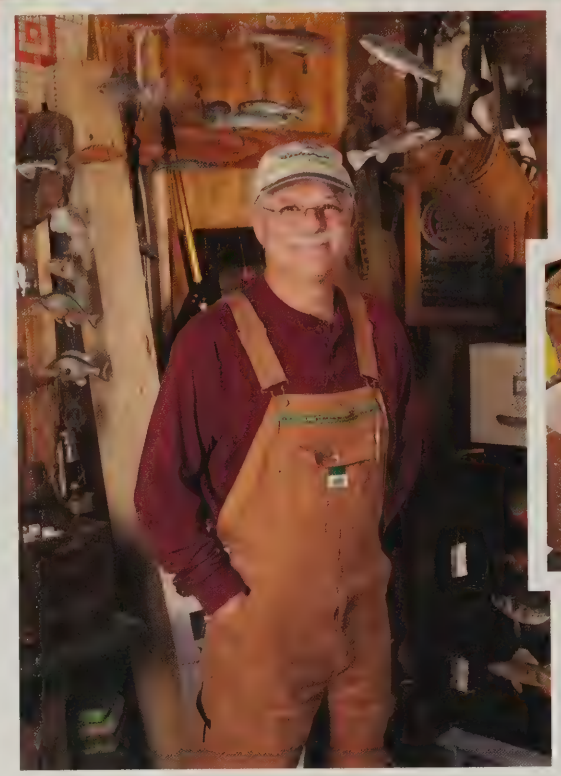
Beneath the timeless guardianship of Morrow Mountain near the peaceful community of Badin, midway between the Atlantic Ocean and Blue Ridge Mountains, sits a hand-built cypress cabin occupied by a couple preoccupied with the outdoors. One-half of the couple is Lisa Snuggs—a daughter of Bodie McDowell, the renowned outdoor enthusiast, newspaper columnist and former N.C. Wildlife Resources Commission media relations official now in retirement.

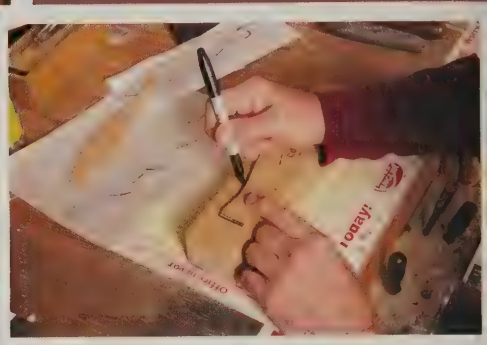
Like Bodie, Lisa is a sparkplug, constantly scurrying about her office in the cabin while performing her duties as executive director of the Southeastern Outdoor Press Association (SEOPA). The other half of the couple is Henry Snuggs, a low-key personality who wears a constant smile on his face. A talented carver and painter of decorative fish, Henry's thoughts of fish and fishing in local lakes and rivers keep his being in harmonious meld with the idyllic scenery.

Walk into Henry's studio and the first thing that catches the eye is a multitude of fish seemingly swimming through the air above a lighted workbench. They turn and weave almost imperceptibly in scant, changing air currents generated by gawking observers who have done no more than simply enter the room to set the fish in motion. The effect is like looking into an aquarium, sans glass, water, driftwood and bottom gravel.

The suspended fish initially resemble a mobile over an infant's crib. But, upon closer inspection, the miniature fish are much too realistic and seemingly fragile to be the playthings of children. The multiplex of fish is the creation of Uncle Henry's Artofishals. Each almost-alive individual fish is preparing to migrate to its new home in someone's den, window or fireplace mantle.

"I call my fish carvings folk art," Henry said. "I had done a lot of the hands-on work of building our home, while working in a motorcycle business until a couple of years ago. Then I left the motorcycle business to have more time to care for my aging parents. I had read a book, 'Collector's Guide to Antique Fishing Tackle,' which was written by Silvio Calabi. When I read the chapters on ice fishing decoys, I was intrigued by them, although I have never been ice fishing. I thought I would be able to carve decoys like that and it





Henry Snuggs needs about six hours to rough out and shape a fish out of a block of wood, and at least two more hours to paint it. The result is what he calls "folk art," like this realistic-looking crappie (far right).

would be fun. I had some time on my hands, and needed some work to do with them."

The moment he saw the book's photos of ice-fishing decoys, Henry was infected with the artist's bug. He had always fiddled around with woodworking, but he had never done anything in the way of folk art carving. That simple wellspring of inspiration unleashed a torrent of talent.

Henry has become a carver and painter of decorative fish, which are much more realistic than carvings patterned after ice fishing decoys. He's a true piscatorial Picasso, sculpting his fish from wood and aluminum, then painting them to seem so realistic an observer expects their gills to flare open and closed.

"The first fish I made was an ice-fishing decoy," he said. "Then I branched out into doing decorative carvings. The differences in folk-art fish and ice-fishing decoys are that folk-art fish are not weighted and balanced, and the fins are not placed like they are for swimming the decoy around in the water through a hole in the ice. Folk-art fish tend to be more realistic than they are functional."

A Passion Project

Henry has become immersed in a folk-art form still in its larval stage. The art of fish carving remains relatively obscure when compared to competitive waterfowl decoy carving. But the beauty of Uncle Henry's Artofishals carvings may help bring fish carving into the mainstream where waterfowl carvings now rule the roost.

Henry said he has carved bluegill, redear, spotted and pumpkinseed sunfish, black crappie and white crappie, largemouth bass and striped bass, blue marlin, red drum, speckled trout, brown trout, rainbow trout, carp, channel catfish and Bodie bass. Bodie bass is the state's official name for the striped bass/white bass hybrid, in honor of Lisa's father who championed their propagation in the state's fish hatchery system and introduction in the state's reservoirs.

"I use paintings, photographs and illustrations as models for carving and painting my fish," Henry said. "I have several Duane Raver prints hanging around the house. Duane is one of Bodie's friends and his paintings are some of the most realistic representations of North Carolina fish that can be found."

Henry suspended a carved representation of a Bodie bass by a string next to one of Raver's paintings and it was an exact duplicate. His carved representation of the fish in the painting was three dimensional rather than two dimensional, making the fish appear to be swimming right out of the background of the painting.

While he said he had carved a blue marlin and a few other fish as custom orders, Henry generally sells his carvings through word of mouth. While I had known Henry for years, I first saw one of his carvings at one of SEOPA's annual conferences.

"You have to see some of Henry's fish carvings," Lisa said. "You won't believe how realistic they are."

Indeed they are. I immediately went into competitive angler mode, trying to "catch" a largemouth bass Henry had donated to SEOPA's silent auction. I hovered nearby to safeguard my bid until the final second, increasing the amount of my offer as others distracted my attention while making theirs as they deviously tried to sneak it away with higher bids.

It takes Henry about six hours to complete the body of a fish and at least two more hours to breathe life into it with paint and brush. He sells a typical fish carving for $100 and up. "I number my carvings and furnish the buyer with a certificate of authenticity," Henry said. "Each one is going to be different because they're handmade and hand-painted. I can only make so many of them because I only have two hands."

Tricks of the Trade

While some competitive duck decoy carvers will not allow anyone to watch them work, Henry has no secrets. He willingly shared the types of materials he uses and his carving and painting techniques.

"At first, I just started carving scrap wood," he said. "I began with cypress because I built my house out of cypress and had some leftover wood. But cypress was too soft and had other problems. A friend who is a cabinetmaker gave me some walnut and cedar. But as I did more research into better carving woods, I discovered that waterfowl decoy carvers use basswood and tupelo. I haven't used any tupelo yet. But I use basswood scraps, which I get from a friend who works at a hardwood distributor. She saves scraps that are at least 2 inches square through the section and I buy them from her."

"Each one is going to be different because they're handmade and hand-painted. I can only make so many of them because I only have two hands."

To begin a carving, Henry first decides what the completed piece will become. If it's a decoy, the form is simpler than it will be for a decorative piece. But a decoy body must be balanced and weighted and the fins placed for stabilizing its use rather than placed for realism.

"Fish decoy fins have been made from sheet copper, sign metal, coffee cans or anything the ice fisherman had," Henry said. "But for decorative carvings, I use scrap pieces of rolled sheet aluminum flashing or siding because aluminum is so easy to work into shape and it won't rust. I use aluminum that has a primer on one side and is textured. I fold it in half with the fold on the outside edge and cut the fins into shape with snips. I don't glue the two sides together because eventually they will separate."

Henry keeps the textured side on the outside and keeps the grain aligned in the direction of the spines and rays. He created a paper pattern for the fins, with the outline and numbers of rays and spines specific to each species.

Henry has created both straight-tailed and curved-tailed designs. For decoys, most ice fishermen use curved-tail designs because it adds to the decoy's "swimming" abilities. But many people also find curved tails on decorative fish more attractive than straight tails. He uses a pencil to trace an outline of the patterns onto the sides, top and bottom of the wooden block. Then he cuts out a rough body using a band saw.

He shapes it with a drum sander until he can remove the remaining material with hand tools. Then he uses carving knives, rasps and files.

"I do most of the roughing with rasps, progressing from course- to fine-toothed rasps then to sandpaper. Then I carve the gill cover details, head, eyes, mouth and nostrils. I have painted the eyes [before]. But I usually buy eyes from a lure making company called Lurecraft, drill holes for them and glue them in place. I glue the eyes in after everything has been painted."

The tail may be a continuation of the body wood, or it may be metal, depending upon the species and Henry's mood. Slots for a metal tail and the other fins are carved with a knife except for the dorsal and anal fins, which are rough-cut into the body with a Dremel Rotary Tool, then enlarged with a knife. The fins are glued in place using Liquid Nails, an exterior construction adhesive.

"After the glue dries, I paint the entire fish with a primer coat," Henry said. "Then I use acrylic paints, mixing them as I go on a palate while constantly looking at the painting or photograph. I paint lighter colors first, then gradually begin working with darker colors. That usually means starting at the belly and working upward to the back."

A base color is blended and brushed onto the fins, then the individual rays and spines are painted. As with the body, the lighter colors are painted first.

"All of the fins, except the dorsal fin, are folded in a way to have the texture going in the same direction as the rays and spines," Henry said. "The dorsal fin is trickier because folding the longer piece of metal does not allow the texture to go the same direction on both sides. Others may solve this problem by using a different type of metal or using non-textured metal and carving the rays and spines into the metal. Part of the fun is that there is no right or wrong way to create a fish carving. It's how it looks that counts."

While it detracts from creating an exact replica of the fish, Henry paints the inside of each fish's mouth red. Most fishing lure mouths are red, so the red mouth is acceptable to most people. In fact, seldom does anyone even notice the color.

"The red mouth is my trademark," Henry said. "If I see a carving with a red mouth, I know immediately it's one of mine."

Henry signs and dates each fish carving on the bottom, then drills a hanging hole in the dorsal fin.

"I put a pencil under the fish, moving it from side to side until I find the balance point," he said. "Since each fish is different, it can be difficult to find the exact center of balance. So, I may have to drill more than one hole to get it just right."

Henry also creates driftwood mounting bases to suspend his carvings for a tabletop or mantle presentation. The carvings range from 4 to 5 inches long for sunfish to 15 inches long for a blue marlin. Henry carved the blue marlin for a friend to give as a Father's Day gift.

"It still amazes me that people saw my first personal carvings and liked them so much they asked me to carve fish for them," he said. "The first carvings I did were for Father's Day presents. I just liked doing them because I thought they were fun and beautiful. Then people started calling them art."

For information about Uncle Henry's Artofishals, contact Henry Snuggs via Facebook or call 704-984-6144. Mike Marsh is a freelance writer and a longtime contributor to Wildlife in North Carolina.

Carefully controlled burns (done by professionals!) help our pine forests grow

Fire in the Pines

written by Sydney Brown
illustrated by Amy Friend

The fire crackles underneath the pines. A bird carefully watches as the fire slowly burns beneath her nest, head cocked. Radios sound as men move about with drip torches, talking and slowly watching the small wall of fire creep forward. A cottontail sits up in the distance, whiskers twitching, as the scent of smoke reaches her. She hops in the opposite direction while crows caw overhead.

UNDERNEATH THE PINES

North Carolina is home to more than 10 different species of pine trees. Our vast pine forests are believed to be the origin of the nickname "The Tar Heel State" because of the pine tar used to protect ship hulls from rotting. Without pines, much of North Carolina's landscape would change and could become unrecognizable.

Pines are hardy trees commonly called a pioneer species because they are often the first to show up after a disturbance. Disturbances come in different forms, like fires, floods, clear-cutting and mowing.

Open pine forests, with treetops barely touching, allow sunlight to reach the ground and let grasses and wildflowers grow. Because so many kinds of plants live there, these habitats are attractive for animals. These unique areas are full of life. Because these habitats will naturally change from grasses and shrubs, to pines, and finally hardwood trees, healthy pine forests must be carefully managed. Humans maintain open pine habitats by creating their own disturbances.

THINNED OUT

Prescribed burning, or scheduled fire, is the tool of choice for creating the beautiful open spaces between pine trees. Before fire can be used, professionals walk through and thin, or cut down trees. A lot of people think logging, or cutting down trees, is harmful to wildlife. However, it is necessary to maintain healthy, open pine habitats.

Choosing what trees to remove involves paint and a paint gun. Teams of five or six professionals mark trees that they want to remove. Depending on how thick the area is, teams will often mark at least 50 percent of the trees to be removed by logging professionals.

LONGLEAF PINE

SHORTLEAF PINE

LOBLOLLY PINE

YELLOW-SHAFTED FLICKER

HOT TIMES

A crew waits by the phone to see if conditions—like wind speed, wind direction and weather—will allow for a burn to take place. A lot of work and preparation go into a burn, but safety is always at the top of the list. If the crew gets the OK, they set out in teams of five to six equipped with drip torches, radios and fire protective gear. Drip torches, which look like giant steel mugs with a little spout sticking out of the top, are the easiest way to start a fire. Inside the torch is a fuel tank and a little trigger, which is used to ignite the fire.

[A NOTE TO PARENTS AND CHILDREN: PLEASE DON'T TRY THIS AT HOME. CONTROLLED BURNS SHOULD ONLY BE DONE BY ADULTS WHO HAVE BEEN TRAINED.]

Once the fire team arrives, everyone looks to the burn boss, who makes sure everybody knows where to go and what to do if something goes wrong. Fire is dangerous, even if the flames are only 6 inches tall at first. The team sets three to four fires along the wood's edges and down the wood's center. As fires meet and race toward the middle, they can grow to 7 or more feet tall!

Once the burning is complete, everything is dark. The ground and the big trees that escaped the fire are all covered with black soot. However, three to six months after the fire, this now-empty land will be full of life.

EASTERN WHITE PINE

Get Outside

Not all pine habitats are the same, so please take your family and friends to see one at any of our game lands. These unique habitats are home to many different species of birds, so be on the lookout for bald eagles, barred owls, screech owls, red-cockaded woodpeckers, downy woodpeckers, pileated woodpeckers, yellow-shafted flickers and many more. Make sure to have your binoculars handy!

FINDING A NEEDLE IN A FOREST

When thinning a stand of trees, people must be able to identify what types of pines to keep or get rid of. One person keeps a tally in a book as others call out the types of trees they are spraying to be thinned by making dots. Do you think you could figure out what pine trees are in the woods near your home by looking at pine needles and cones?

First, ask an adult for permission and start gathering your materials.

MATERIALS:

Paper, Pencil, Ruler, Camera, Compass

Go into the woods. Be on the lookout for these types of pines:

EASTERN WHITE PINE (Mountains & Western Piedmont)—Grows on high, dry, sandy and rocky ridges, but prefers cool, moist, sandy soils. Needles are soft bluish-green and 3 to 5 inches long. They grow in a bundle of five and have three to five white lines on either side of the needle. Cones are 4 to 8 inches long, curved, with smooth cone scales.

SHORTLEAF PINE (All of N.C.)—Can be found in pine and mixed hardwood stands. Needles are 3 to 5 inches long and are dark green, growing in a bundle of two or three. Cones are egg-shaped and 1 1/2 to 2 1/2 inches long with a short spine (spike) at the tip of each scale.

LOBLOLLY PINE (Coastal & Eastern Piedmont)—Is the most common pine growing in the Coastal Plain and Eastern Piedmont. Needles are in clusters of three and are slender and stiff, growing 6 to 9 inches long. They have oblong cones which are 2 to 6 inches long and are light-reddish to brown in color with a spine at the tip of each scale.

LONGLEAF PINE (Coastal & Eastern Piedmont)—This pine species is found in various parts of eastern North Carolina. Needles are bright green and are 8 to 15 inches long in a bundle of three. It has the largest of the Southern pine cones at 6 to 10 inches long and is tipped with spines.

Once you have figured out what a particular pine looks like, start by walking 50 steps north and only count the pines you can see. As you walk, make sure you are tallying the amount of pine species by recording it in a notebook.

WHAT DID YOU FIND?

Whether you found many species of pines or just one, you have learned something about the landscape. Depending on location and disturbances, you can tell if an area is being managed or if the forest is changing from pine to hardwoods. Fewer pines are signs of an older forest that hasn't been disturbed in a long time. Don't let your knowledge of identifying pines go to waste—make sure to practice and impress your friends while you're in the woods.

Help Arrives for the Red-Cockaded Woodpecker

With the ceremonial planting of longleaf pine seedlings in April, a new partnership has sprouted that will manage a small black-and-white woodpecker and its habitat while allowing the Marine Corps to enhance its operational and training opportunities on Marine Corps Base Camp Lejeune.

The Red-Cockaded Woodpecker (RCW) Recovery and Sustainment Program (RASP) partnership held a groundbreaking ceremony in Sneads Ferry to celebrate the implementation of long-term management plans on the Stones Creek Game Land and on the nearby Bear Garden tract of the Holly Shelter Game Land. The plan will create new habitat for RCWs with the goal of establishing 60 active RCW clusters outside the boundaries of the military installation. The Marine Corps' RCW recovery goal is administered under the Endangered Species Act.

"This is exactly how things should work," said Congressman Walter Jones. "All of these agencies and the U.S. Marine Corps working together to protect an endangered species is a wonderful thing."

Along with the N.C. Wildlife Resources Commission, which will lead the management effort, the partnership includes the U.S. Fish and Wildlife Service, the National Fish and Wildlife Foundation, Marine Corps Installations East at Marine Corps Base Camp Lejeune, the U.S. Department of the Navy and the Naval Facilities Engineering Command, Mid-Atlantic.

The Marine Corps and the Office of the Secretary of Defense funded a perpetual endowment fund, which will be managed by the National Fish and Wildlife Foundation, to cover the costs of RCW management on the game lands. The Wildlife Commission will conduct short and long-term management activities to establish and conserve longleaf pine forest habitat essential for RCW recovery. Commission biologists will manage the properties to RCW habitat standards in order to establish 60 active RCW clusters off base. The Marine Corps will continue its RCW conservation and recovery efforts on base as well.

TODD PUSSER

MELISSA McGAW/NCWRC

Executive Director Gordon Myers announces the Red-Cockaded Woodpecker Recovery and Sustainment Program that will create new habitat for the species.

Partners planted the seedlings to symbolize their commitment to restore and conserve longleaf pine forests found on the game lands. These forests were likely once home to the RCW and, like the woodpecker, have disappeared from much of their historical range. RASP has also secured conservation easements protecting woodpecker habitat on nearly 2,726 acres of the Stones Creek Game Land, which will potentially support 12 RCW clusters, and 12,269 acres of the Bear Garden tract on the Holly Shelter Game Land in Pender County. The Bear Garden tract will potentially support 48 RCW clusters. Unlike other woodpecker species, the RCW is the only woodpecker that excavates nest cavities in live trees.

"Their habitat requirements of old-growth pine forests have made red-cockaded woodpeckers vulnerable to extirpation in several states, including North Carolina, where they are now found mainly on federal lands and military bases," said Wildlife Commission Executive Director Gordon Myers. "This partnership is a great example of the military and wildlife agencies working collaboratively to ensure the viability of the red-cockaded woodpecker in perpetuity while removing barriers for military readiness and maximizing resources and opportunities."

e NEWSLETTER

Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at ncwildlife.org/enews.

Gray Stone, Perquimans Take Home Titles At YHES Tournament

A high school from Stanly County and a middle school from Perquimans County took top honors at the 2018 Youth Hunter Education Skills Tournament in April.

The annual pre-collegiate tournament, facilitated by the N.C. Wildlife Resources Commission and its Hunter Education Program, allows youth to showcase outdoor skills and demonstrate safety techniques that they learn in the program. The state tournament is held annually at the John F. Lentz Hunter Education Complex in Richmond County.

Gray Stone Day School's Garnette team won the senior division for the second straight year, scoring 3,627 points out of a possible 4,000. Perquimans County Middle School won the junior division with an overall score of 3,406.

"Winning the competition in back-to-back years is a huge accomplishment," said Josh Jernigan, the Commission's shooting sports coordinator. "And congratulations to the Perquimans County Middle School team. Both teams are great examples of how dedicated students and exemplary coaching and support can lead to great things."

Students competed in four events throughout the day, including archery, rifle and shotgun marksmanship, along with an orienteering and written hunter responsibility test combination event. Teams compete on senior (high school) and junior (middle and elementary school) divisional levels, with overall team and individual awards based on aggregate scores in all events.

Approximately 575 students from 60 teams participated in this year's state tournament. They advanced from their regional tournaments held in March in nine districts across the state. The teams are made up of individuals from public and private schools, as well as home-school associations and 4-H Clubs.

The North Davie Middle School team was awarded the Fred Rorrer Trophy for sportsmanship. The trophy honors its namesake, a longtime hunting education instructor and Commission employee who died in 2010. Rorrer is remembered for his dedication to conservation and leadership in the youth tournaments.

For tournament results and additional information, go to ncwildlife.org/YHEST or call 919-707-0031.

MELISSA McGAW/NCWRC

The Perquimans County Middle School (black shirts) and the Gray Stone Day School teams each won first place at YHEST.

Tiny Bog Turtles Get Refuge

TODD PUSSER

A tiny turtle with an uncertain future in North Carolina got a helping hand recently, thanks to a donation of 25 acres of wetlands in Burke County.

The family of Robert Millard and Mary Charlotte Crump Smith donated the land to the N.C. Wildlife Resources Commission, which will use the property to conserve much-needed habitat for bog turtles, a species that is federally and state-listed as Threatened, as well as identified as a Species of Greatest Conservation Need in the N.C. Wildlife Action Plan.

Bog turtles are the smallest turtles found in North America, reaching an adult length of only 4 to 5 inches. In North Carolina, bog turtles are found only in the western part of the state. They live in marshy, wetland-type habitats, and spend most of their time underwater, buried in mud or hiding in thick, low vegetation. Destruction of their habitats is one of the greatest threats to bog turtle populations.

"We have been conducting bog turtle surveys every year to monitor their populations in the state," said Commission Western Wildlife Diversity Supervisor Kendrick Weeks. "What we have found during these surveys is that bog turtle numbers continue to decline overall. That is why we are so excited to get this land donation."

This property, which sits along Bristol Creek near the Commission's Johns River Game Land, is even more exciting to biologists because it is near areas where bog turtles have been found in the past.

"Bog turtles need soft, mucky wetland soil to forage throughout the spring, summer and fall as well as to hibernate in during the winter," Weeks said. "They also need an open canopy and low vegetation cover for efficient thermoregulation. For nesting purposes, they need some embedded or adjacent drier areas."

Commission biologists conducted surveys last summer, but did not find any bog turtles. This spring, they will continue to survey the site in hopes of finding turtles. They will also assess the site for needed habitat improvements.

CALENDAR OF EVENTS

Saturday, July 7

The 55th Annual Coon Dog Day will be held in Saluda. This celebration of dogs and their people will feature food, live music, a parade, crafts, Big Wheel races and much more. The downtown event that started as a chicken dinner fundraiser for a local coon hunting club now attracts 10,000 visitors a year. Go to Saluda.com for more information.

[illegible] August

Dove season opens in September and it's the traditional kickoff to fall hunting season. So, if you don't already have one, it's time to get a hunting license. There are two options for taking the required Hunter Education course: the traditional six-hour instructor-led class, or an online course which will require a local two-hour review session with a proctored exam. Both course options will focus on ethics and responsibility, conservation, wildlife management and more. To register for a class near you, or to take the online portion of the class, visit ncwildlife.org/Hunting/Before-the-Test.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to ***events@ncwildlife.org,*** *or call 919- 707-0175.*

LIFETIME LICENSES

Help conserve wildlife for future generations. In 1981, hunters, anglers and wildlife enthusiasts became shareholders in an innovative investment and conservation program called the North Carolina Wildlife Endowment Fund.

Today, the commission has 19 different lifetime licenses in five categories: Infant, Youth, Adult, Senior and Disabled.

The endowment fund for wildlife was a simple yet revolutionary idea: Create a lifetime inland fishing or hunting license. Put the license fees into a special fund. Spend the accrued interest, not the principal, on programs and projects that benefit fish and wildlife. To learn more or to purchase a lifetime license visit ncwildlife.org/licensing or call 1-888-248-6834.

Commission Debuts New Game Land, Expands Another One

The N.C. Wildlife Resources Commission has completed a land acquisition that will add 2,500 acres to the Johns River Game Land in Burke County. The land was purchased from Duke Energy in April.

"The Johns River land acquisition exemplifies the power of partnership by enabling the Commission to increase this game land by 66 percent," Commission Executive Director Gordon Myers said. "This game land will provide lifetimes of access and opportunity for many of our constituents and it enables us to conserve the abundance of habitat for multiple significant species."

The acreage will adjoin the 3,887 acres currently known as the Johns River Game Land, which was originally purchased with funds provided by Duke Energy as part of the 2006 Catawba-Wateree Comprehensive Relicensing Agreement and grants from the Clean Water and Natural Heritage Trust Funds. Following this latest acquisition, the game land will encompass 6,448 acres.

The N.C. Wildlife Resources Commission and the Piedmont Land Conservancy (PLC) announced the creation of the Dan River Game Land in April. The PLC transferred 1,068 acres in Rockingham County to the Commission to help create the Dan River Game Land.

The acreage will adjoin an additional 660 acres acquired by the Commission in 2017. The new game land will provide the Triad area with public access to fishing and hunting opportunities.

"This is not only an important conservation project, it is also a magnet for outdoor enthusiasts," said Senate Leader Phil Berger (R-Rockingham). "I commend the Piedmont Land Conservancy and the Commission for conserving these game lands so that hunters, fisherman and the public can experience many of the abundant natural resources that Rockingham County has to offer."

The 1,068-acre acquisition that completes this game land was funded by a $2.6 million grant provided by the N.C. Clean Water Management Trust Fund. The original 660 acres that were acquired in 2017 were acquired with $1 million from U.S. Fish and Wildlife Service, Wildlife and Sport Fish Restoration Funds and a $586,000 grant obtained by the PLC.

"We appreciate the chance to partner with the Conservancy to manage and conserve this unique property for the benefit of the citizens of Rockingham and surrounding counties," said Chris Jordan, the Commission's game lands and forest resources manager. With more than 2 million acres of public game lands in North Carolina, outdoor enthusiasts have ample opportunity to experience hunting, fishing, hiking, birding, nature photography and more. For more information, visit ncwildlife.org/gamelands.

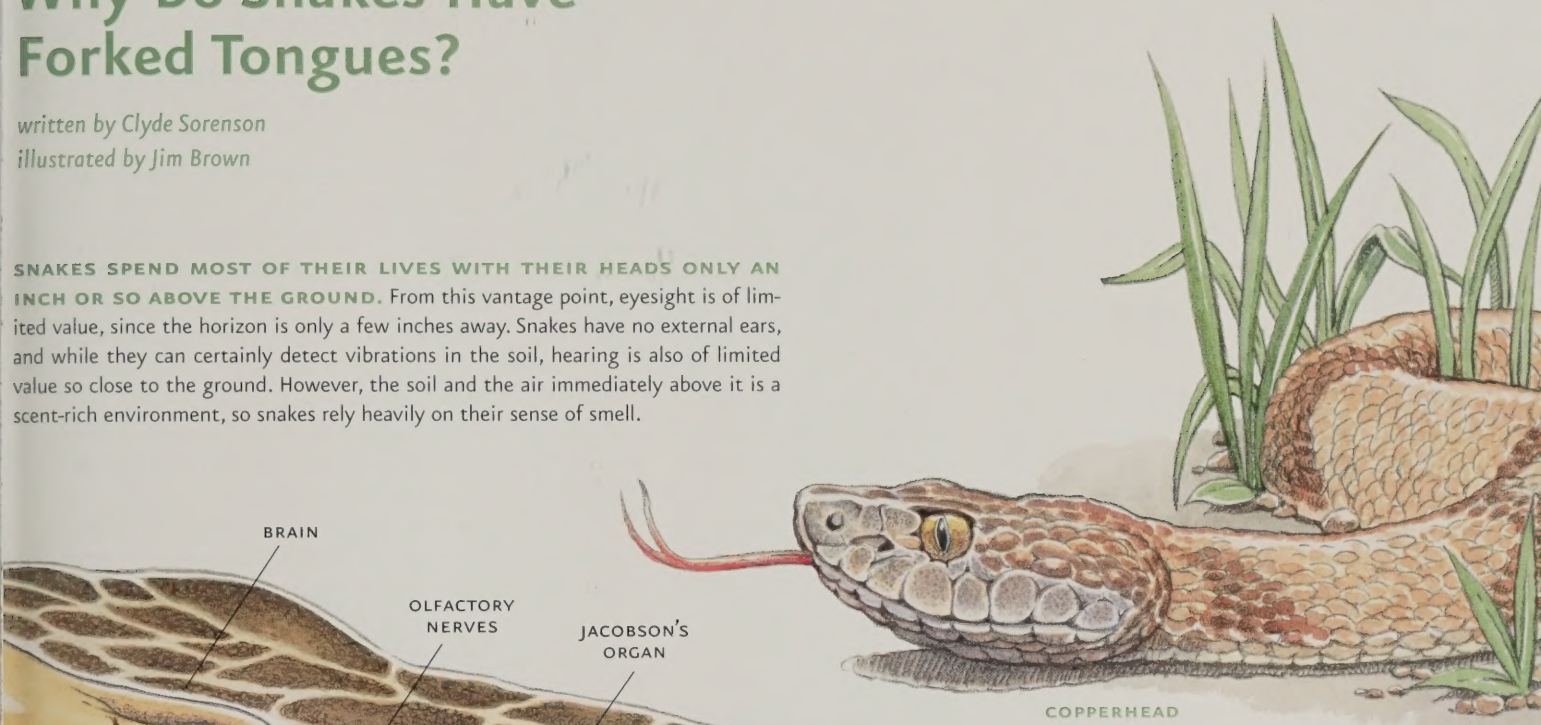
MELISSA McGAW/NCWR

Left to right: Commission Chairman John Coley with Duke Energy's Steve Jester and Commission Executive Director Gordon Myers.

Why Do Snakes Have Forked Tongues?

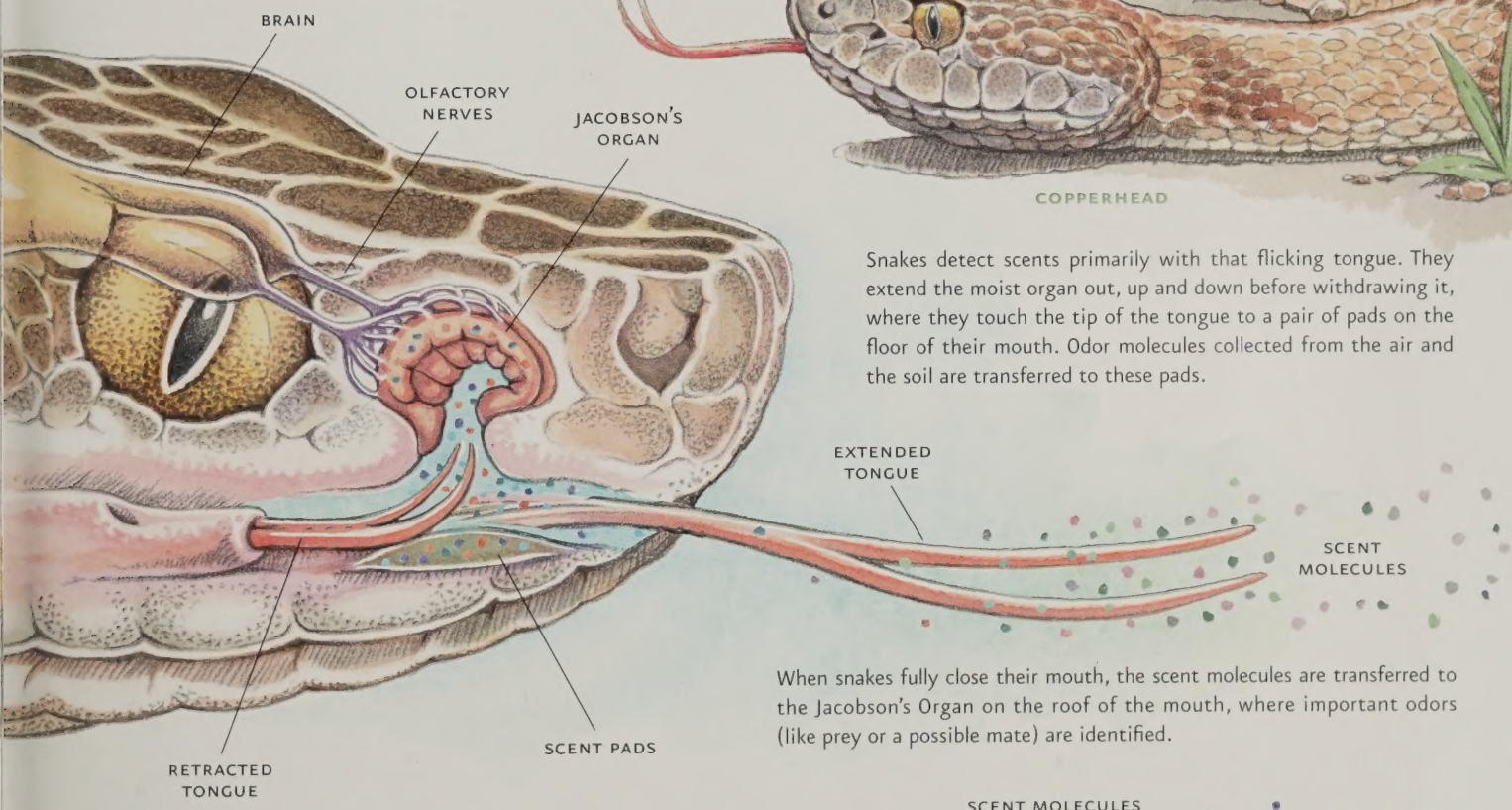
written by Clyde Sorenson
illustrated by Jim Brown

SNAKES SPEND MOST OF THEIR LIVES WITH THEIR HEADS ONLY AN INCH OR SO ABOVE THE GROUND. From this vantage point, eyesight is of limited value, since the horizon is only a few inches away. Snakes have no external ears, and while they can certainly detect vibrations in the soil, hearing is also of limited value so close to the ground. However, the soil and the air immediately above it is a scent-rich environment, so snakes rely heavily on their sense of smell.

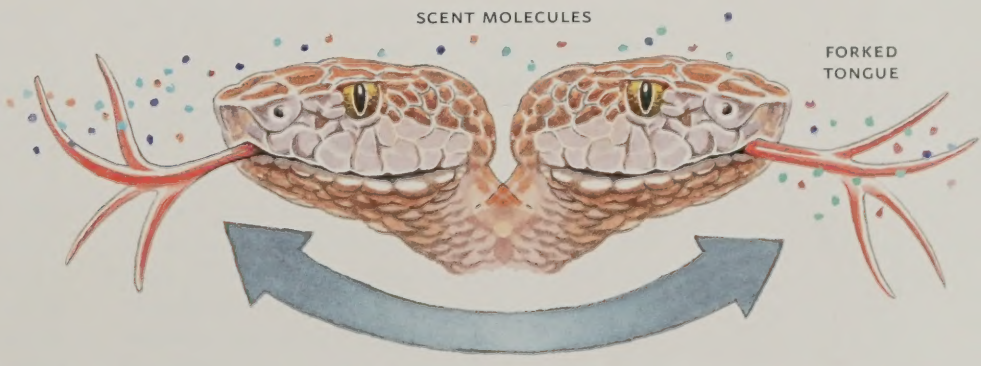


COPPERHEAD

Snakes detect scents primarily with that flicking tongue. They extend the moist organ out, up and down before withdrawing it, where they touch the tip of the tongue to a pair of pads on the floor of their mouth. Odor molecules collected from the air and the soil are transferred to these pads.



When snakes fully close their mouth, the scent molecules are transferred to the Jacobson's Organ on the roof of the mouth, where important odors (like prey or a possible mate) are identified.



TONGUE DIRECTS SNAKE LEFT OR RIGHT

Snakes have that forked tongue for the same reason moths and other insects have two antennae: to allow them to determine the direction of an odor's origin. If they detect an odor of interest with only the left prong of the tongue, they shift their head to the left before tasting the air again. If the odor is stronger on the right, they shift to the right. This allows them to follow the scent to its origin, leading to a possible meal or more.

Life On The End

written by Jim Dean

To honor the memory of our colleague and friend, and to celebrate the 40th anniversary of his "Our Natural Heritage" column, Wildlife in North Carolina will publish some of our favorite Jim Dean columns in this space for the remainder of 2018. "Life on the End" was originally published in October 1985.

"IT takes several days to get into it: to stop making notes of things suddenly remembered, errands forgotten, duties undone, responsibilities shirked. Out there, a thousand feet from the beach, the pilings shift with the green swells, and there is only the occasional hiss of water and the distant laughter of children. That and the sounds made by fishermen who are unhurried and not always terribly hopeful.

"Be some blues in with the tide," says one as he flips a cigarette over the rail. "Outside the sandbar. Maybe." He leans there, staring out to sea with no expectation that anyone might answer him.

"Take your watch off when you fish a pier. You won't miss it."

Later, someone says, "Need a little change in the weather."

"Wouldn't hurt," says his companion, reaching to tug on a set line that anchors a live bait. "Your blue is fixing to get around that other line over there unless you tighten up a little."

A family appears on the end of the pier: man, wife and two daughters. They look bored and as pale as Michelangelo sculptures. Nothing is happening, or appears to have ever happened, but the question is always asked. Several hundred times a day. "Anybody getting anything?

"Spanish last evening," someone answers. "No kings since last week."

"Spanish?" the father repeats. It is clear that he doesn't understand the answer. But he and his family have completed the annual vacation ritual—they have walked to the end of the pier.

Actually, the fishermen barely notice. After two days on a pier, you could not say with certainty whether tomorrow is Wednesday, or possibly Thursday. After a week, you no longer care. Your body rhythms and senses have been redirected. The ears hear only the click of a reel or flop of a fish on the hot, greasy planks. Eyes see little beyond the distant mudline, a dark patch of menhaden or the flash of mackerel under a bait.Tuned to the tides and the wind, you are human only from 10 p.m. when you collapse in a gritty bed until you arise at 4 a.m. and arrive on the pier shivering and holding the first of many Styrofoam cups of wretched coffee.

Some fishermen believe that fishing an ocean pier is the lowest form of angling, an overly simplistic "chunk and chance" recreation conceived to appeal to those who cannot afford a charter boat. I tend to think it is more like baseball—a subtle, perhaps even cerebral, form of angling that is an acquired taste. My perspective may be warped, but I would often rather fish a pier than troll offshore. It is a question of challenge and finesse.

You see, it is a myth that pier fishing is a sport that requires no skill. Indeed, it takes many years to learn to fish a pier properly from beach wash to tip, and to do so through all the seasonal peaks. From early spring until the piers close under the lash of winter storms, there is a more or less continual change in the menu. There are several dozen saltwater species that can be caught from a pier from spring through fall, but ironically, their appearance is both predictable and uncertain. You may know when the bluefish, flounder, pompano, Spanish and king mackerel, puppy drum, cobia, sheepshead, spots and sea mullet normally make their migratory entrance, but weather can advance or delay that appointment.

Not only must you know the habits and migration patterns of all these fish, you must learn dozens of different fishing techniques. Take a day in late summer or fall, for example. Beginning in the curl of the shorebreak, you might catch pompano and sea mullet on live soft shelled mole crabs. In the slough, live shrimp, minnows or strip bait will take flounders. Spots and other bottom-feeding panfish may also be feeding in the slough on fresh shrimp or bloodworms. Farther out, just beyond the sand bar, the blues may be chasing minnows depending upon the tide. Sheepshead will be nibbling on tiny crustaceans around the pilings. At the end of the pier, Spanish mackerel and blues will be flashing at lures and king mackerel may be stalking a live bait.

It takes years to learn all the techniques for these and many other species, and it's a rare trip that won't reveal at least one or two new wrinkles.

It may look dull to the casual observer, but pier fishing can be as simple as you want, or as complex as you make it. And it has a certain appeal that is as timeless and hypnotic as the surf. Take your watch off when you fish a pier. You won't miss it.

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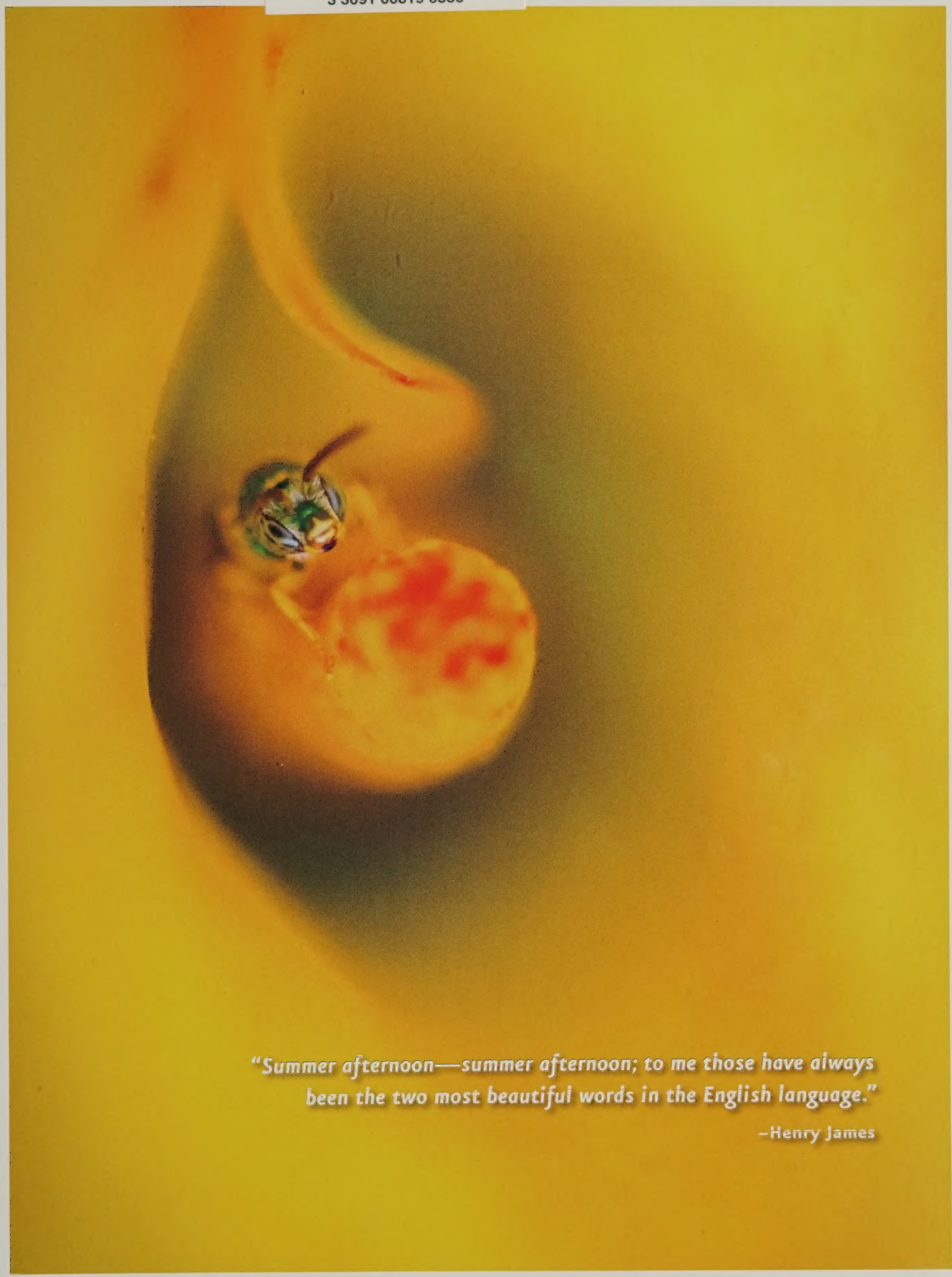


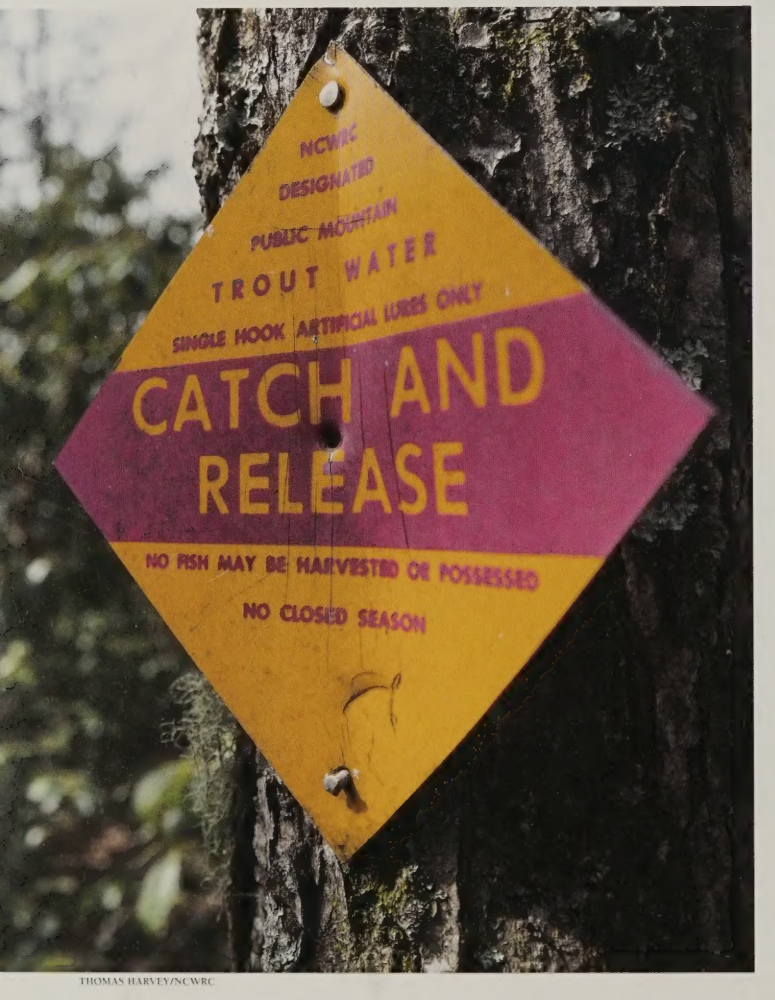
"Summer afternoon—summer afternoon; to me those have always been the two most beautiful words in the English language."

–Henry James

MIKE BERG

Green sweat bee on calla lily

IN THE SEPTEMBER • OCTOBER ISSUE



THOMAS HARVEY/NCWRC

BROOK TROUT RESTORATION

The Wildlife Resources Commission has spent several years working to restore populations of native brook trout in our mountain streams.

A KEEN EYE

Roughly 1,000 deer hunters are helping monitor wildlife populations by noting what animals they see in the woods for the North Carolina Deer Hunter Observation Survey.

SPOT THE SPOTTED SKUNKS

Did you know that North Carolina is home to a second species of skunk? The elusive spotted skunk is drawing more attention because of a steady decline in its population.

TO SUBSCRIBE CALL 1-800-786-2721
FIND US ON THE WEB AT ncwildlife.org

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